Addonics iSCSI Subsystem

ISC8P2G-S

User Manual

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Chapter 1 RAID Introduction

1.1 Features

The **Addonics ISC8P2G-S iSCSI subsystem** is a high-performance hardware RAID controller.

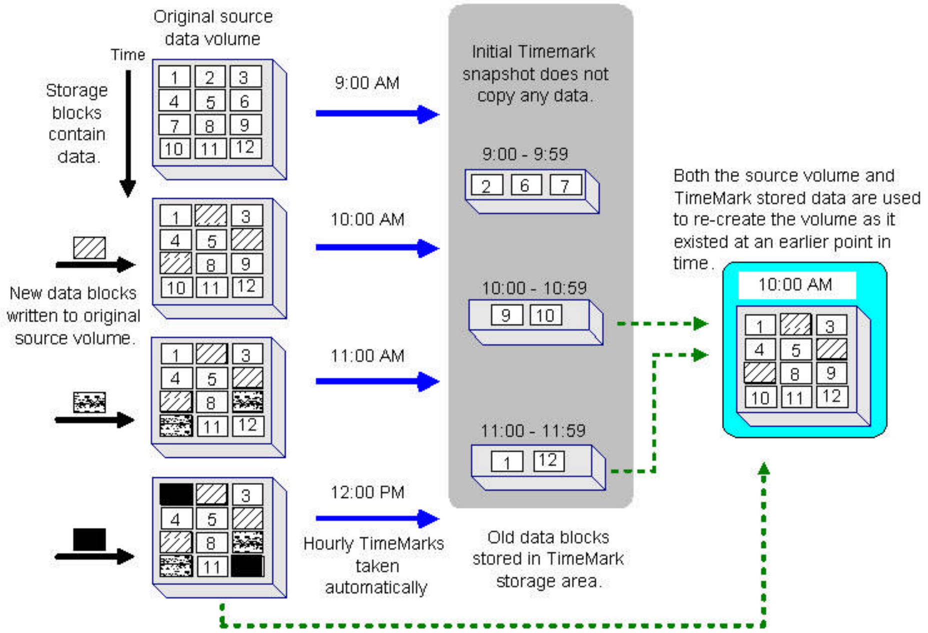
- 2 GbE NIC ports.
- iSCSI jumbo frame support.
- RAID 6, 60 ready.
- Snapshot (QSnap) integrated on the subsystem.
- SATA II drives backward compatible.
- One logic volume can be shared by as many as 32 hosts.
- Host access control.
- Configurable N-way mirror for high data protection.
- On-line volume migration with no system downtime.
- HDD S.M.A.R.T. enabled for SATA drives.
- Header/data digest support.
- Microsoft VSS, VDS support.

With proper configuration, ISC8P2G-S iSCSI subsystem can provide non-stop service with a high degree of fault tolerance using RAID technology and advanced array management features.

The ISC8P2G-S iSCSI subsystem connects to the host system via iSCSI interface. It can be configured to any RAID level. ISC8P2G-S provides reliable data protection for servers using **RAID 6**. RAID 6 allows two HDD failures without any impact on the existing data. Data can be recovered from the remaining data and parity drives.

The ISC8P2G-S iSCSI subsystem is the most cost-effective disk array controller with completely integrated high-performance and data-protection capabilities which meet or exceed the highest industry standards. **The best data solution for small/medium business (SMB) users.**

Snapshot-on-the-box (QSnap) is a fully usable copy of a defined collection of data that contains an image of the data as it appeared at a point in time. It is a point-in-time data replication. It provides consistent and instant copies of data volumes without any system downtime. **Addonics** Snapshot-on-the-box can keep up to 32 snapshots for all data volumes. **Rollback** feature is provided for restoring the previous-snapshot data easily while continuously using the volume for further data access. Data access which includes read/write is working at the background without any impact to end users. The "on-the-box" implies that it does not require any proprietary agents installed at host side. The snapshot is taken at target side and done by **ISC8P2G-S**. It will not consume any host CPU. The snapshot copies can be taken manually or be scheduled every hour or every day.


Original source data volume
Time
Storage blocks contain data.
New data blocks written to original source volume.
9:00 AM
10:00 AM
11:00 AM
12:00 PM
Hourly TimeMarks taken automatically
Initial Timemark snapshot does not copy any data.
9:00 - 9:59
10:00 - 10:59
11:00 - 11:59
Old data blocks stored in TimeMark storage area.
Both the source volume and TimeMark stored data are used to re-create the volume as it existed at an earlier point in time.
10:00 AM

Caution
Snapshot (QSnap) / rollback features need **512MB** RAM or more. Please refer to RAM certification list in Appendix A for more detail.

1.2 Terminology

The document uses the following terms:

RAID	RAID is the abbreviation of **"R**edundant **A**rray of **I**ndependent **D**isks**"**. There are different RAID levels with different degree of data protection, data availability, and performance to the host environment.
PD	The **P**hysical **D**isk is a member disk of one specific volume group.
VG	**V**olume **G**roup. A collection of removable media. One VG consists of a set of UDVs and owns one RAID level attribute.
UDV	**U**ser **D**ata **V**olume. Each VG could be divided into several UDVs. The UDVs from one VG share the same RAID level, but may have different volume capacity.
CV	**C**ache **V**olume. ISC8P2G-S uses the on board memory as cache. All RAM (except for the part which is occupied by the controller) can be used as cache. User can divide the cache for one UDV or share among all UDVs. Each UDV will be associated with one CV for data transaction. Each CV could be assigned different cache memory sizes.
LUN	**L**ogical **U**nit **N**umber. A logical unit number (LUN) is a unique identifier used on an iSCSI connection which enables it to differentiate among separate devices (each of which is a logical unit).
GUI	**G**raphical **U**ser **I**nterface.
RAID width, RAID copy, RAID row (RAID cell in one row)	RAID width, copy and row are used to describe one VG. E.g.: 1. One 4-disk RAID 0 volume: RAID width= 4; RAID copy=1; RAID row=1. 2. One 3-way mirroring volume: RAID width=1; RAID copy=3; RAID row=1.

	3. One RAID 10 volume over 3 4-disk RAID 1 volume: RAID width=1; RAID copy=4; RAID row=3.
WT	**W**rite-**T**hrough cache write policy. A caching technique in which the completion of a write request is not signaled until data is safely stored on non-volatile media. Each data is synchronized in both data cache and the accessed physical disks.
WB	**W**rite-**B**ack cache write policy. A caching technique in which the completion of a write request is signaled as soon as the data is in cache and actual writing to non-volatile media occurs at a later time. It speeds up system write performance but bears the risk where data may be inconsistent between data cache and the physical disks in one short time interval.
RO	Set the volume to be **R**ead-**O**nly.
DS	**D**edicated **S**pare disks. The spare disks are only used by one specific VG. Others could not use these dedicated spare disks for any rebuilding purposes.
GS	**G**lobal **S**pare disks. GS is shared for rebuilding purpose. If some VGs need to use the global spare disks for rebuilding, they could get the spare disks out from the common spare disks pool for such requirement.
DC	**D**edicated **C**ache.
GC	**G**lobal **C**ache.
DG	**D**e**G**raded mode. Not all of the array's member disks are functioning, but the array is able to respond to application read and write requests to its virtual disks.
S.M.A.R.T.	**S**elf-**M**onitoring **A**nalysis and **R**eporting **T**echnology.
SCSI	**S**mall **C**omputer **S**ystems **I**nterface.
WWN	**W**orld **W**ide **N**ame.
HBA	**H**ost **B**us **A**dapter.
MPIO	**M**ulti-**P**ath **I**nput/**O**utput.

MC/S	**M**ultiple **C**onnections per **S**ession
S.E.S	**S**CSI **E**nclosure **S**ervices.
SAF-TE	**S**CSI **A**ccessed **F**ault-**T**olerant **E**nclosures.
NIC	**N**etwork **I**nterface **C**ard.
iSCSI	**I**nternet **S**mall **C**omputer **S**ystems **I**nterface.
LACP	**L**ink **A**ggregation **C**ontrol **P**rotocol.
MTU	**M**aximum **T**ransmission **U**nit.
CHAP	**C**hallenge **H**andshake **A**uthentication **P**rotocol. An optional security mechanism to control access to an iSCSI storage system over the iSCSI data ports.
iSNS	**I**nternet **S**torage **N**ame **S**ervice.

1.3 RAID levels

RAID 0	Disk striping. ISC8P2G-S RAID 0 needs at least two hard drives.
RAID 1	Disk mirroring over two disks. RAID 1 needs at least two hard drives.
N-way mirror	Extension to RAID 1 level. It has N copies of the disk.
RAID 3	Striping with parity on the dedicated disk. RAID 3 needs at least three hard drives.
RAID 5	Striping with interspersed parity over the member disks. RAID 5 needs at least three hard drives.
RAID 6	2-dimensional parity protection over the member disks. RAID 6 needs at least four hard drives.

RAID 0+1	Mirroring of the member RAID 0 volumes. RAID 0+1 needs at least four hard drives.
RAID 10	Striping over the member RAID 1 volumes. RAID 10 needs at least four hard drives.
RAID 30	Striping over the member RAID 3 volumes . RAID 30 needs at least six hard drives.
RAID 50	Striping over the member RAID 5 volumes. RAID 50 needs at least six hard drives.
RAID 60	Striping over the member RAID 6 volumes. RAID 60 needs at least eight hard drives.
JBOD	The abbreviation of **"J**ust a **B**unch **O**f **D**isks**"**. JBOD needs at least one hard drive.

1.4 Volume relationship diagram

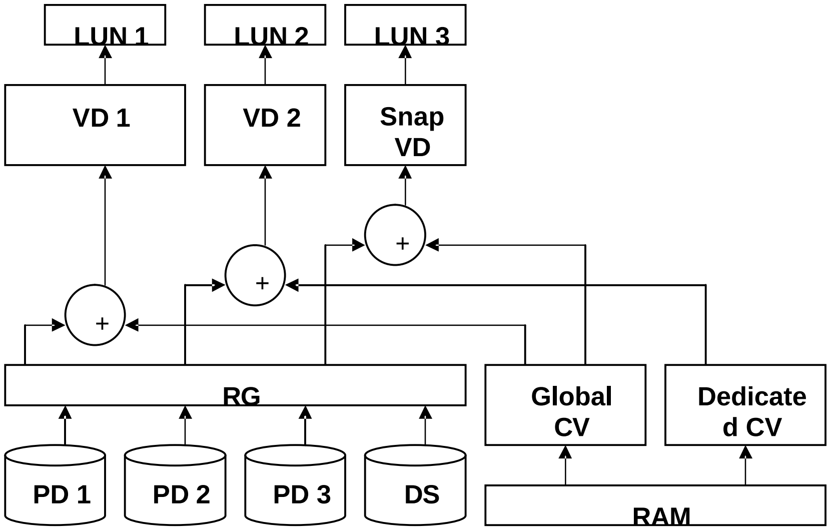

LUN 1
LUN 2
LUN 3
VD 1
VD 2
Snap VD
+
+
+
RG
Global CV
Dedicated CV
PD 1
PD 2
PD 3
DS
RAM

Figure 1.4.1

Formatted

This is the volume structure Addonics designed. It describes the relationship of RAID components. One RG (RAID group) consists of a set of VDs (Virtual disk) and owns one RAID level attribute. Each RG can be divided into several VDs. The VDs in one RG share the same RAID level, but may have different volume capacity. Each VD will be associated with one specific CV (Cache Volume) to execute the data transaction. Each CV can have different cache memory size by user's modification/setting. LUN (Logical Unit Number) is a unique identifier, in which users can access through SCSI commands.

Chapter 2 Getting started

2.1 Before starting

Before starting, prepare the following items.

1. Check the **"Certification list"** in Appendix A to confirm the hardware setting is fully supported.
2. A server or worksation with a NIC or iSCSI HBA.
3. CAT 5e, or CAT 6 network cables for web GUI IP port and iSCSI data ports. We recommend CAT 6 cables for best performance.
4. Prepare storage system configuration plan.
5. Management (web GUI IP port) and iSCSI data ports network information. When using static IP, prepare static IP addresses, subnet mask, and default gateway.
6. Gigabit LAN switches. (Recommended)
7. CHAP security information, including CHAP usernames and secrets. (Optional)
8. Setup the hardware connection before powering up servers and ISC8P2G-S iSCSI subsystem. Connect web GUI IP port cable, and iSCSI data port cables first.

2.2 iSCSI introduction

iSCSI (Internet SCSI) is a protocol which encapsulates SCSI (Small Computer System Interface) commands and data in TCP/IP packets for linking storage devices with servers over common IP infrastructures. iSCSI provides high performance SANs over standard IP networks like LAN, WAN or the Internet.

IP SANs are true SANs (Storage Area Networks) which allow servers to attach to an infinite number of storage volumes by using iSCSI over TCP/IP networks. IP SANs can scale the storage capacity with any type and brand of storage system. IP-SANs also include mechanisms for security, data replication, multi-path and high availability.

Storage protocol, such as iSCSI, has "two ends" in the connection. These ends are the initiator and the target. In iSCSI we call them iSCSI initiator and iSCSI target. The iSCSI initiator requests or initiates any iSCSI communication. It requests all SCSI operations like read or write. An initiator is usually located on the host/server side (either an iSCSI HBA or iSCSI Software initiator).

The iSCSI target is the storage device itself or an appliance which controls and serves volumes or virtual volumes. The target is the device which performs SCSI commands or bridges it to an attached storage device. iSCSI targets can be disks, tapes, RAID arrays, tape libraries, and etc.

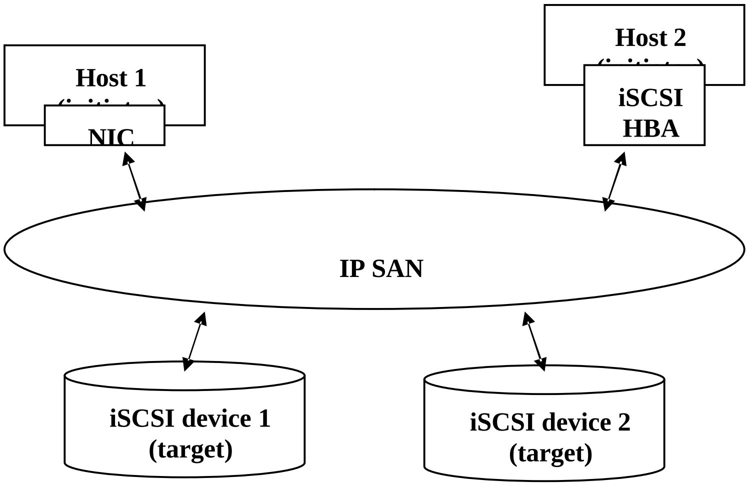


Figure 2.2.1

The host side needs an iSCSI initiator. The initiator is a driver which handles the SCSI traffic over iSCSI. The initiator can be software or hardware (HBA). Refer to the certification list of iSCSI HBA(s) in Appendix A. OS native initiators or other software initiators use the standard TCP/IP stack and Ethernet hardware, while iSCSI HBA(s) use their own iSCSI and TCP/IP stacks.

Hardware iSCSI HBA(s) would provide its initiator tool. Refer to the vendors' HBA user manual. **Microsoft**, **Linux** and **Mac** provide software iSCSI initiator driver. Below are the available links:

1. Link to download the Microsoft iSCSI software initiator:
   http://www.microsoft.com/downloads/details.aspx?familyid=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en

   Refer to Appendix D for Microsoft iSCSI initiator installation procedure.

2. Linux iSCSI initiator is also available. For different kernels, there are different iSCSI drivers. Check Appendix A for software iSCSI initiator certification list. If user needs the latest Linux iSCSI initiator, please visit Open-iSCSI project for most update information. Linux-iSCSI (sfnet) and Open-iSCSI projects merged in April 11, 2005.

   Open-iSCSI website: http://www.open-iscsi.org/

Open-iSCSI README: http://www.open-iscsi.org/docs/README
Google groups:
http://groups.google.com/group/open-iscsi/threads?gvc=2
http://groups.google.com/group/open-iscsi/topics

3. globalSAN iSCSI Initiator for OS X
http://www.studionetworksolutions.com/products/product_detail.php?t=more&pi=11
ATTO iSCSI initiator is available for Mac.
Website: http://www.attotech.com/xtend.html

2.3 Management methods

There are three management methods to manage ISC8P2G-S iSCSI subsystem:

2.3.1 Web GUI

ISC8P2G-S supports graphical user interface (GUI) to manage the system. The default setting of the web GUI port IP is DHCP and the DHCP IP address is displayed on the LCM. A user can check the LCM for the IP address first, then open a web browser and type the DHCP address: (The DHCP address is dynamic and user may need to check every time after reboot again.)
E.g., on LCM.

```
192.168.1.50
Addonics ISC8P2G-S   •
```

http://192.168.1.50

Move the cursor on any of the function block located on the left side of the web browser, a dialog box opens to authenticate current user.

Login as Administrator

Login name: **admin**
Default password: **supervisor**

To login as **Read-Only account**.

Login name: **user**
Default password: **1234**

Note: It only allows seeing the configuration but cannot change any setting.

2.3.2 Console serial port (Optional)

Use NULL modem cable to connect console port.
The console setting is baud rate: **115200**, 8 bits, 1 stop bit, and no parity.
Terminal type: **vt100**
Login name: **admin**
Default password: **supervisor**

2.3.3 Remote control – secure shell

SSH (secure shell) is required for ISC8P2G-S to remote login. The SSH client software is available at the following web site:
SSHWinClient WWW: http://www.ssh.com/
Putty WWW: http://www.chiark.greenend.org.uk/

Host name: **192.168.1.50 (Check your DHCP address for this field.)**
Login name: **admin**
Default password: **supervisor**

E.g.
$ ssh admin@192.168.1.50

Tips
ISC8P2G-S only support SSH for remote control. When using SSH, the IP address and the password is required for login.

2.4 Enclosure

2.4.1 LCM

There are four buttons to control **ISC8P2G-S** LCM (LCD Control Module), including:

- (up), , (down), **ESC** (Escape), and **ENT** (Enter).

After booting up the system, the following screen shows web GUI port IP and model name:

```
192.168.1.50
Addonics ISC8P2G-S•
```

Press **“ENT”**.

The following are LCM functions: **“Alarm Mute”**, **“Reset/Shutdown”**, **“Quick Install”**, **“View IP Setting”**, **“Change IP Config”** and **“Reset to Default”**. To shift between the menus, press • (up) or , (down) buttons.

When a WARNING or ERROR is detected within the device, the LCM displays the event log to provide users more details.

The following table shows each function’s description.

System Info.	Display system information.
Alarm Mute	To mute the alarm when an error occurs, select this function.
Reset/Shutdown	To reset or shutdown the ISC8P2G-S.
Quick Install	Three Quick steps to create a volume. Refer to section 3.3 for procedure using the web GUI.
Volume Wizard	Smart steps to create a volume. Refer to next chapter for operation in web UI.
View IP Setting	Display current IP address, subnet mask, and gateway.
Change IP Config	Set IP address, subnet mask, and gateway. There are 2 selections, DHCP (Get IP address from DHCP server) or set static IP.
Reset to Default	Reset to default sets password to default: **supervisor**, and set IP address to default as DHCP setting. Example: Default IP address: **192.168.1.50 (DHCP)** Default subnet mask: **255.255.255.0** Default gateway: **192.168.1.254**

The following is LCM menu hierarchy.

Addonics Technology • ,	[System Info.]	[Firmware Version x.x.x]			
		[RAM Size xxx MB]			
	[Alarm Mute]	[• Yes No ,]			
	[Reset/Shutdown]	[Reset]	[• Yes No ,]		
		[Shutdown]	[• Yes No ,]		
	[Quick Install]	RAID 0 RAID 1 RAID 3 RAID 5 RAID 6 RAID 0+1 xxx GB	[Apply The Config]	[• Yes No ,]	
	[Volume Wizard]	[Local] RAID 0 RAID 1 RAID 3 RAID 5 RAID 6 RAID 0+1	[Use default algorithm]	[Volume Size] xxx GB	[Apply The Config] [• Yes No ,]
		[JBOD x] • , RAID 0 RAID 1 RAID 3 RAID 5 RAID 6 RAID 0+1	[new x disk] • , xxx BG	Adjust Volume Size	[Apply The Config] [• Yes No ,]
	[View IP Setting]	[IP Config] [Static IP]			
		[IP Address] [192.168.010.050]			
		[IP Subnet Mask] [255.255.255.0]			
		[IP Gateway] [192.168.010.254]			
	[Change IP Config]	[DHCP]	[• Yes No ,]		
		[Static IP]	[IP Address]	Adjust IP address	
			[IP Subnet Mask]	Adjust Submask IP	
			[IP Gateway]	Adjust Gateway IP	
			[Apply IP Setting]	[• Yes No ,]	
	[Reset to Default]	[• Yes No ,]			

Caution
Before powering off, it is recommended to execute **“Shutdown”** to flush the data from cache to physical disks.

2.4.2 System buzzer

The system buzzer features are describe in the following:

1. The system buzzer alarms for 1 second when system boots up successfully.
2. The system buzzer alarms continuously when an error event happens. To stop the alarm, use the alarm mute option.
3. The alarm will be muted automatically when the error situation is resolved. E.g., when a RAID 5 array is degraded and the alarm rings. After a user changes/adds one physical disk for rebuilding, and when the rebuilding is done, the alarm will be muted automatically.

2.4.3 LED

The LED features are describe as follows:

1. **POWER LED**: Hardware activated LED when system is powered on.
2. **BUSY LED**: Hardware activated LED when the front-end channel is busy.
3. **System STATUS LED**: Indicates system status. When an error occurs or the RAID is degraded, the LED lights up.

Chapter 3 Web GUI guideline

3.1 ISC8P2G-S Web GUI Hierarchy

The table below shows the hierarchy of ISC8P2G-S Web GUI.

Quick installation		à	Step 1 / Step 2 / Confirm
System configuration			
	System setting	à	System name / Date and time
	IP address	à	MAC address / Address / DNS / port
	Login setting	à	Login configuration / Admin password / User password
	Mail setting	à	Mail
	Notification setting	à	SNMP / Messenger / System log server / Event log filter
iSCSI configuration			
	Entity property	à	Entity name / iSNS IP
	NIC	à	Aggregation / IP settings for iSCSI ports / Become default gateway / Enable jumbo frame
	Node	à	Create / Authenticate / Rename / User / Delete
	Session	à	Session information / Delete
	CHAP account	à	Create / Delete
Volume configuration			
	Volume create wizard		Step 1 / Step 2 / Step 3 / Step 4 / Confirm
	Physical disk	à	Set Free disk / Set Global spare / Set Dedicated spare / Set property / More information
	RAID group	à	Create / Migrate / Activate / Deactivate / Scrub / Delete / Set disk property / More information
	Virtual disk	à	Create / Extend / Scrub / Delete / Set property / Attach LUN / Detach LUN / List LUN / Set snapshot space / Cleanup snapshot / Take snapshot / Auto snapshot / List snapshot / More information
	Snapshot	à	Cleanup snapshot / Auto snapshot / Take snapshot / Export / Rollback / Delete
	Logical unit	à	Attach / Detach
Enclosure management			
	SES configuration	à	Enable / Disable
	Hardware monitor	à	Auto shutdown
	S.M.A.R.T.	à	S.M.A.R.T. information **(Only for SATA disks)**
	UPS	à	UPS Type / Shutdown battery level / Shutdown delay / Shutdown UPS
Maintenance			

System information	à	System information
Upgrade	à	Browse the firmware to upgrade / Export configuration
Reset to default	à	Sure to reset to factory default?
Import and export	à	Import/Export / Import file
Event log	à	Download / Mute / Clear
Reboot and shutdown	à	Reboot / Shutdown
Logout		Sure to logout?

3.2 Login

On the web browser, type the IP address shown on the LCM display.

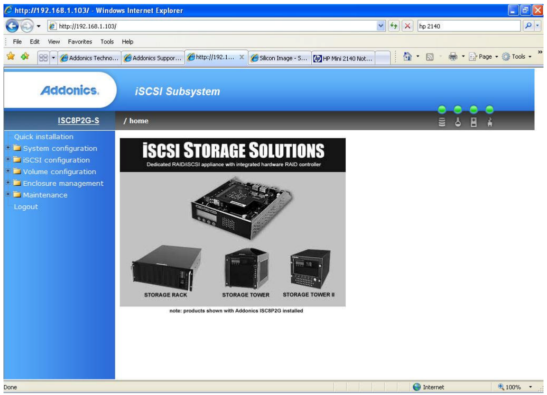

http://192.168.1.103/ - Windows Internet Explorer
Addonics
iSCSI Subsystem
ISC8P2G-S
/ home
Quick installation
System configuration
iSCSI configuration
Volume configuration
Enclosure management
Maintenance
Logout
iSCSI STORAGE SOLUTIONS
Dedicated RAID/iSCSI appliance with integrated hardware RAID controller
STORAGE RACK
STORAGE TOWER
STORAGE TOWER II
note: products shown with Addonics ISC8P2G installed

Figure 3.2.1

Place the cursor on any function block located on the left side of window then do a right click, an authentication window opens up.

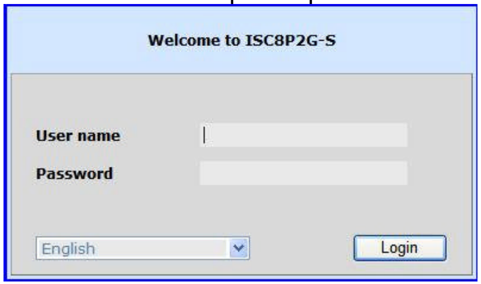

Welcome to ISC8P2G-S
User name
Password
English
Login

Figure 3.2.2

User name: admin
Password: supervisor

After login, you can choose the Quick installation function block on the left side of the window to do configuration.

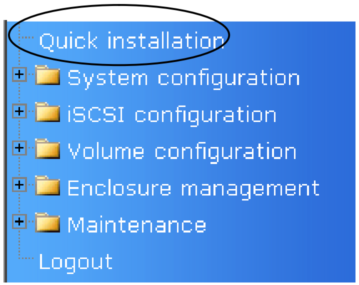

Quick installation
System configuration
iSCSI configuration
Volume configuration
Enclosure management
Maintenance
Logout

Figure 3.2.3

There are four indicators at the top -right corner of the web GUI.

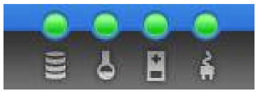


Figure 3.2.4

1. **RAID light:** Green means, the RAID array is correctly functioning. Red represents RAID failure or degradation.

2. **Temperature light:** Green is normal. Red represents abnormal temperature.

3. **Voltage light:** Green is normal. Red represents abnormal voltage status.

4. **UPS light:** Green is normal. Red represents abnormal UPS status.

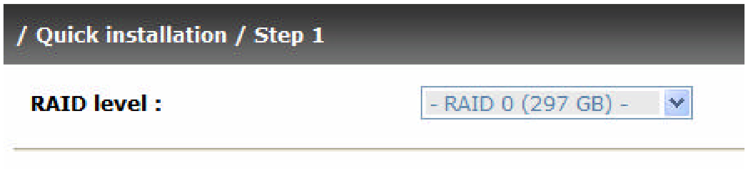
3.3 Quick Installation

The “Quick installation” function is used to create a volume.

The ISC8P2G-S Quick Installation function has a smart policy. When the system is full, meaning all 8 HDD are connected and all HDD have the same size, ISC8P2G-S’s Quick Install function lists all possible configurations and sizes among different RAID level options. The ISC8P2G -S Quick installation will use all available HDD for the RAID level which the user decides.

But when the system is inserted with different sizes of HDD, e.g., 6*200G HDD and 2*80G, ISC8P2G-S also lists all possible combinations of different RAID Level and different sizes and you may observe there are some HDD not used (Free Status).

Step 1: Click **“Quick installation”**, then choose the RAID level. After choosing the RAID level, then click “Next >>”. It will link to another page.



/ Quick installation / Step 1

RAID level : - RAID 0 (297 GB) -

Figure 3.3.1

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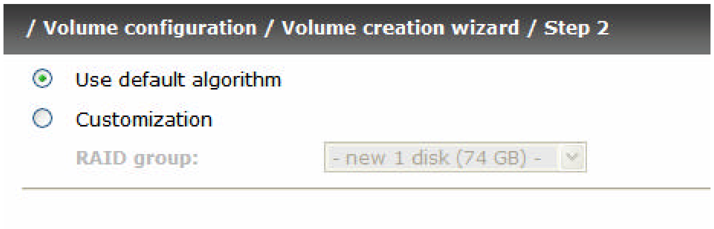
Step 2: Click “Next >>” to use default algorithm.



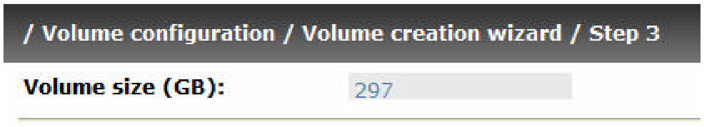
/ Volume configuration / Volume creation wizard / Step 2

● Use default algorithm

○ Customization

RAID group: - new 1 disk (74 GB) -

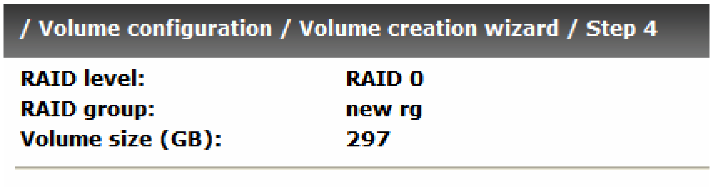
Step 3: Click “Next >>” to select the default volume size.



/ Volume configuration / Volume creation wizard / Step 3

Volume size (GB): 297

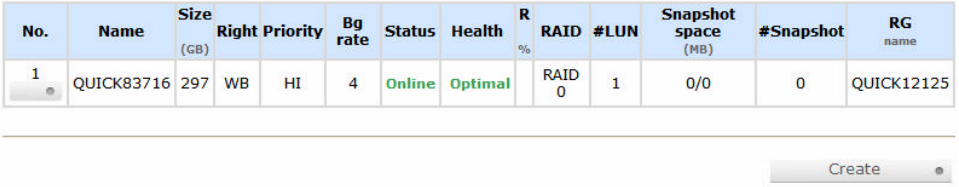
Step 4: Confirm page. Click "Confirm" if all setups are correct. Then a VD will be created.



/ Volume configuration / Volume creation wizard / Step 4

RAID level:	RAID 0
RAID group:	new rg
Volume size (GB):	297

Done. You can start to use the system now.



No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name
1	QUICK83716	297	WB	HI	4	Online	Optimal		RAID 0	1	0/0	0	QUICK12125

Figure 3.3.2

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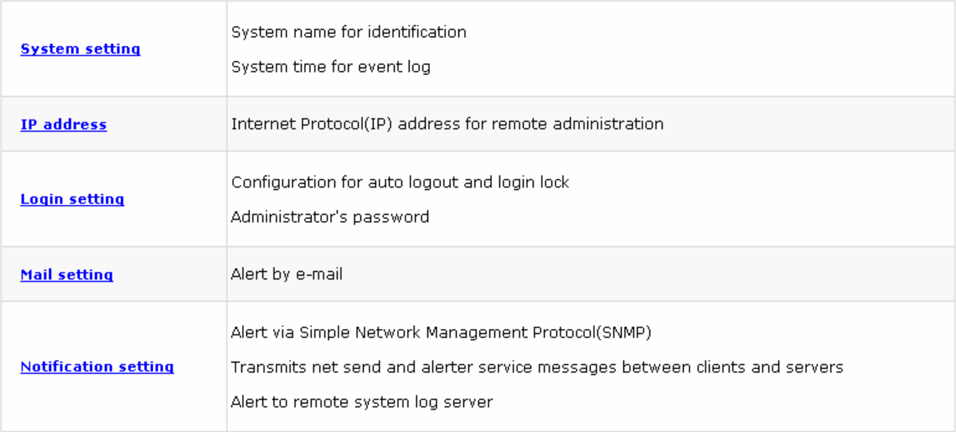
(Figure 3.3.2: A RAID 0 Virtual disk with the VD name "QUICK83716", named by system itself, with the total available volume size 297GB.)

3.4 System configuration

“System configuration” is used for setting up the **“System setting”**, **“IP address”**, **“Login setting”**, **“Mail setting”**, and **“Notification setting”**.



System setting	System name for identification System time for event log
IP address	Internet Protocol(IP) address for remote administration
Login setting	Configuration for auto logout and login lock Administrator's password
Mail setting	Alert by e-mail
Notification setting	Alert via Simple Network Management Protocol(SNMP) Transmits net send and alerter service messages between clients and servers Alert to remote system log server

Figure 3.4.1

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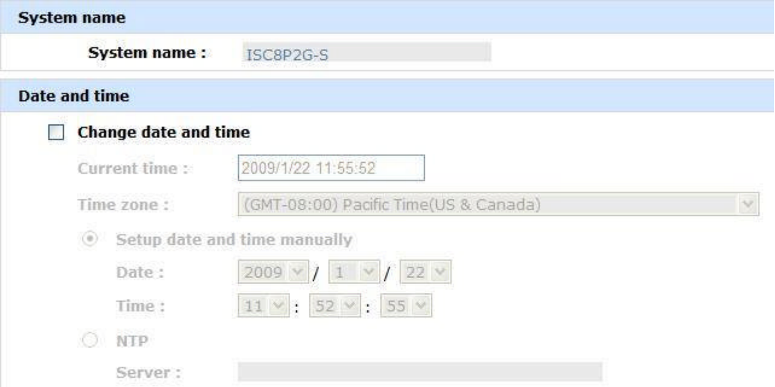
3.4.1 System setting

“System setting” can set system name and date. Default **“System name”** is the model name, e.g.: ISC8P2G-S. You can modify the system name.



System name

System name : ISC8P2G-S

Date and time

☐ Change date and time

Current time : 2009/1/22 11:55:52

Time zone : (GMT-08:00) Pacific Time(US & Canada)

● Setup date and time manually

Date : 2009 / 1 / 22

Time : 11 : 52 : 55

○ NTP

Server :

Figure 3.4.1.1

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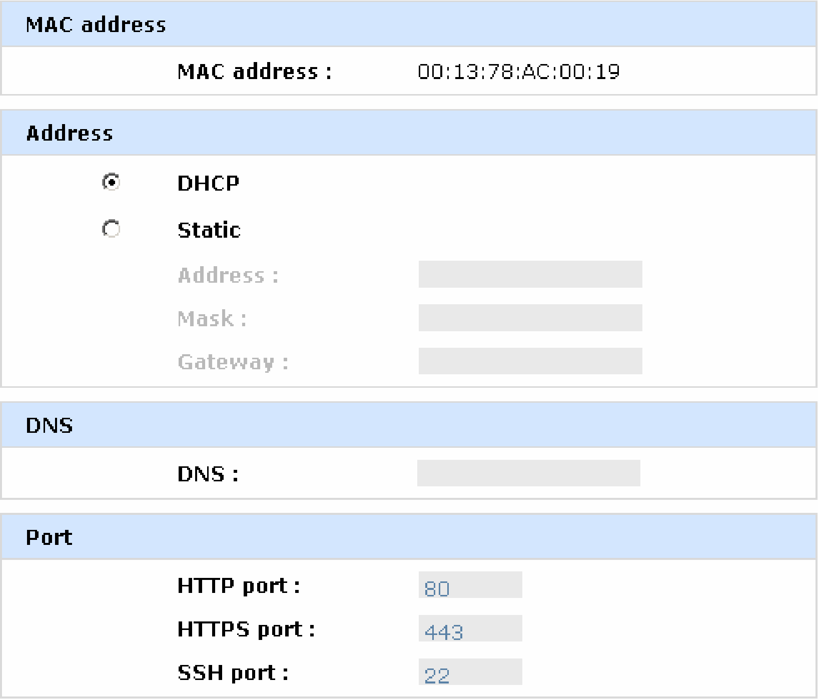
Check **“Change date and time”** to set up the current date, time, and time zone before using or synchronize time from NTP (Network Time Protocol) server.

3.4.2 IP address

"IP address" enables you to change the IP address for remote administration usage. There are 2 options, DHCP (Get IP address from DHCP server) or static IP. The default setting is DHCP. User can change the HTTP, HTTPS, and SSH port number when the default port number is not allowed on host/server.



MAC address

MAC address : 00:13:78:AC:00:19

Address

● **DHCP**

○ **Static**

Address :

Mask :

Gateway :

DNS

DNS :

Port

HTTP port : 80

HTTPS port : 443

SSH port : 22

Figure 3.4.2.1

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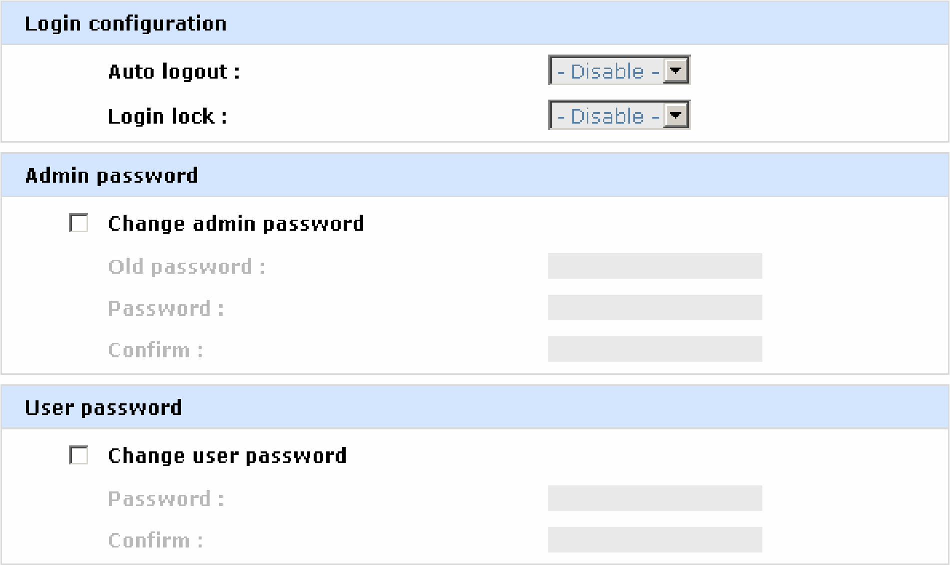
3.4.3 Login setting

"Login setting" enables you to set single admin management , auto logout time and Admin/User password . The single admin management can prevent multiple users accessing the same ISC8P2G -S at the same time.

1. **Auto logout:** The options are (1) Disable; (2) 5 minutes; (3) 30 minutes; (4) 1 hour. The system will log out automatically when user is inactive for a period of time.

2. **Login lock:** Disable/Enable. When the login lock is enabled, the system allows only one user to login or modify system settings.



Login configuration

Auto logout : - Disable -

Login lock : - Disable -

Admin password

☐ Change admin password

Old password :

Password :

Confirm :

User password

☐ Change user password

Password :

Confirm :

Figure 3.4.3.1

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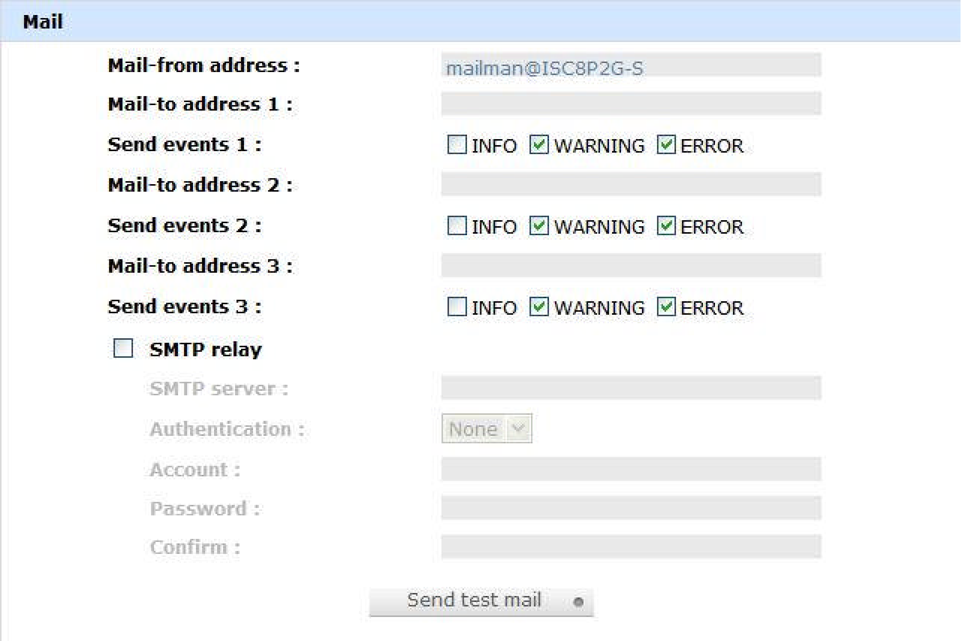
Check **"Change admin password"** or **"Change user password"** to change admin or user password. The maximum length of the password is 12 characters.

3.4.4 Mail setting

"Mail setting" Enter at most 3 mail addresses for receiving the event notification. Some mail servers would check **"Mail-from address"** and need authentication for anti-spam. Fill the necessary fields and click **"Send test mail"** to test whether email functions are available. User can also select which levels of event logs will be sent via mail. Default setting only enables ERROR and WARNING event logs.



Mail

Mail-from address : mailman@ISC8P2G-S
Mail-to address 1 :
Send events 1 : ☐ INFO ☑ WARNING ☑ ERROR
Mail-to address 2 :
Send events 2 : ☐ INFO ☑ WARNING ☑ ERROR
Mail-to address 3 :
Send events 3 : ☐ INFO ☑ WARNING ☑ ERROR
☐ **SMTP relay**
SMTP server :
Authentication : None
Account :
Password :
Confirm :

Figure 3.4.4.1

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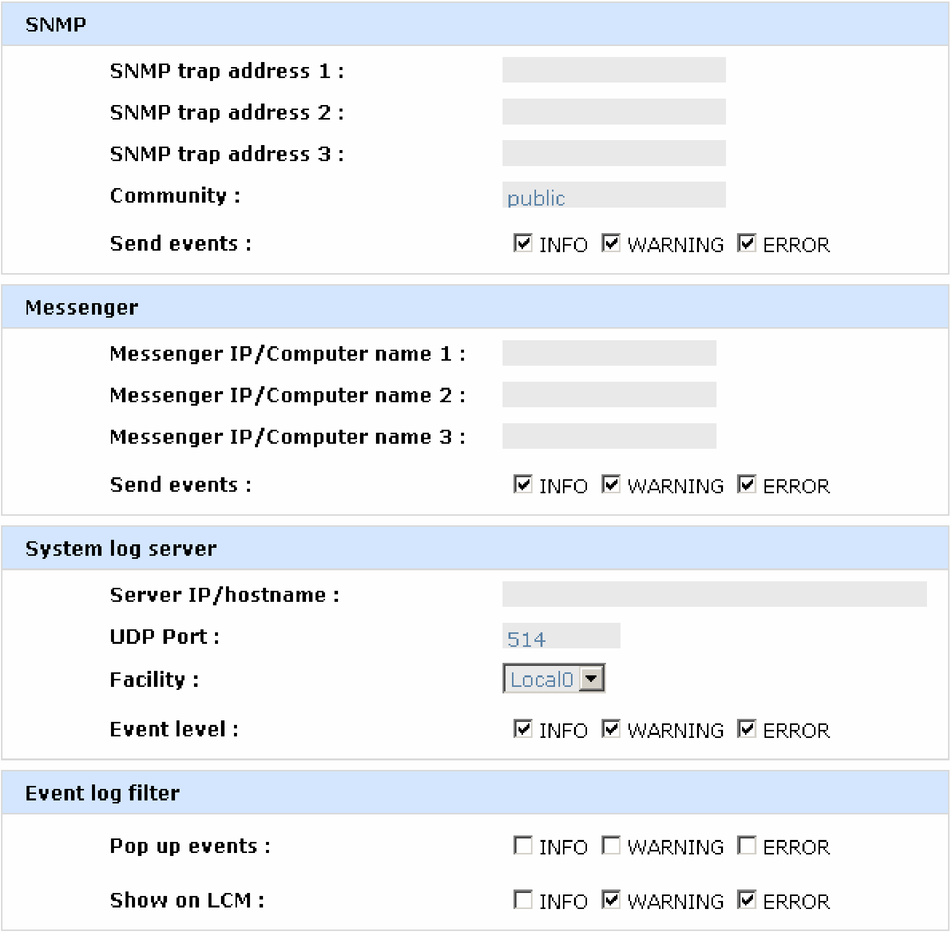
3.4.5 Notification setting

“Notification setting” can set up SNMP trap for alerting via SNMP, pop-up message via Windows Messenger (not MSN), alert via syslog protocol, and event log filter.



SNMP

SNMP trap address 1 :
SNMP trap address 2 :
SNMP trap address 3 :
Community : public
Send events : ☑ INFO ☑ WARNING ☑ ERROR

Messenger

Messenger IP/Computer name 1 :
Messenger IP/Computer name 2 :
Messenger IP/Computer name 3 :
Send events : ☑ INFO ☑ WARNING ☑ ERROR

System log server

Server IP/hostname :
UDP Port : 514
Facility : Local0
Event level : ☑ INFO ☑ WARNING ☑ ERROR

Event log filter

Pop up events : ☐ INFO ☐ WARNING ☐ ERROR
Show on LCM : ☐ INFO ☑ WARNING ☑ ERROR

Figure 3.4.5.1

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“SNMP” allows up to 3 SNMP trap addresses. Default community setting is “public”. User can choose the event log levels and default setting only enables INFO event log in SNMP. There are many SNMP tools. The following web sites are for your reference:

SNMPc: http://www.snmpc.com/
Net-SNMP: http://net-snmp.sourceforge.net/

Using **"Messenger"**, user must enable the service "Messenger" in Windows (Start à Control Panel à Administrative Tools à Services à Messenger), and then event logs can be received. It allows up to 3 messenger addresses. User can choose the event log levels and default setting enables the WARNING and ERROR event logs.

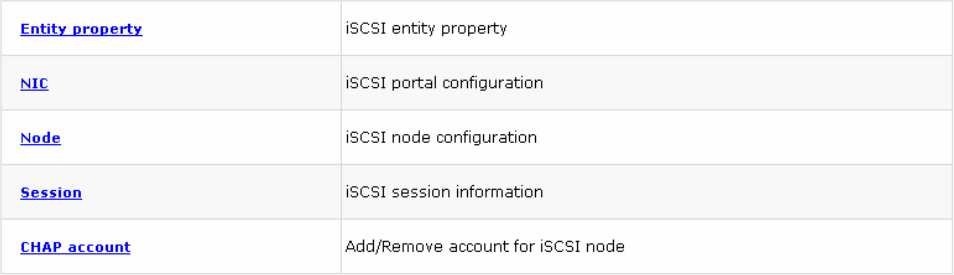
Using **"System log server"**, user can choose the facility and the event log level. The default port of syslog is 514. The default setting enables event level: INFO, WARNING and ERROR event logs.

There are some syslog server tools. The following web sites are for your reference:
WinSyslog: http://www.winsyslog.com/
Kiwi Syslog Daemon: http://www.kiwisyslog.com/
Most UNIX systems build in syslog daemon.

"Event log filter" setting can enable event level on "Pop up events" and "LCM".

3.5 iSCSI configuration

"iSCSI configuration" is designed for setting up the **"Entity Property"**, **"NIC"**, **"Node"**, **"Session"**, and **"CHAP account"**.



Entity property	iSCSI entity property
NIC	iSCSI portal configuration
Node	iSCSI node configuration
Session	iSCSI session information
CHAP account	Add/Remove account for iSCSI node

Figure 3.5.1

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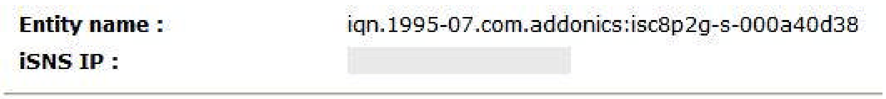
3.5.1 Entity property

"Entity property" will enable you to view the entity name of the ISC8P2G-S, and setup **"iSNS IP"** for iSNS (Internet Storage Name Service). iSNS protocol allows automated discovery, management and configuration of iSCSI devices on a TCP/IP network. If using iSNS, you need to install a iSNS server in the SAN. Add an iSNS server IP address into iSNS server lists in order that iSCSI initiator service can send queries. The entity name of **ISC8P2G-S** can not changed.



Entity name :	iqn.1995-07.com.addonics:isc8p2g-s-000a40d38
iSNS IP :	

Figure 3.5.1.1

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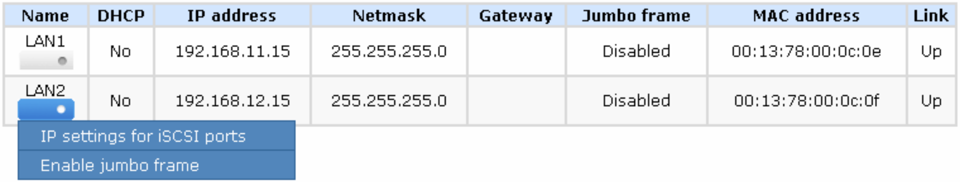
3.5.2 NIC

"NIC" can change IP addresses of iSCSI data ports. The ISC8P2G-S has two gigabit LAN ports to transmit data.



Name	DHCP	IP address	Netmask	Gateway	Jumbo frame	MAC address	Link
LAN1	No	192.168.11.15	255.255.255.0		Disabled	00:13:78:00:0c:0e	Up
LAN2	No	192.168.12.15	255.255.255.0		Disabled	00:13:78:00:0c:0f	Up

Figure 3.5.2.2

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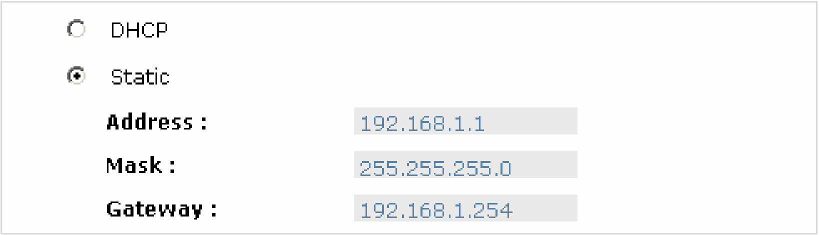
(Figure 3.5.2.2: ISC8P2G-S has 2 iSCSI data ports. Each of them is set to dynamic IP.)

IP settings:

User can change the IP address by moving cursor to the gray button of the LAN port, select **"IP settings for iSCSI ports"** from the drop down menu. There are 2 selections, DHCP (Get IP address from DHCP server) or static IP.



○ DHCP

● Static

Address : 192.168.1.1

Mask : 255.255.255.0

Gateway : 192.168.1.254

Figure 3.5.2.4

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Default gateway:

Default gateway can be changed by moving cursor to the gray button of the LAN port, click **"Become default gateway"**.

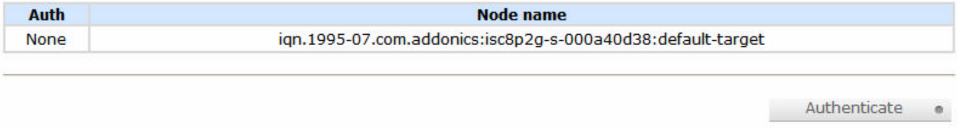
MTU / Jumbo frame:

MTU (**M**aximum **T**ransmission **U**nit) size can be enabled by moving cursor to the gray button of LAN port, click **"Enable jumbo frame"**.

Caution
The MTU size of the switching hub and HBA on the host must be enabled. Otherwise, the LAN connection cannot work properly.

3.5.3 Node

"Node" enables you to view the target name for iSCSI initiator. **ISC8P2G-S** supports single-node. The node name of **ISC8P2G-S** cannot be changed.



Auth	Node name
None	iqn.1995-07.com.addonics:isc8p2g-s-000a40d38:default-target

Figure 3.5.3.1

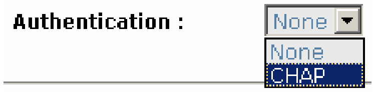
(Figure 3.5.3.1: ISC8P2G-S, single-mode.)

CHAP:

CHAP is the abbreviation of **C**hallenge **H**andshake **A**uthorization **P**rotocol. CHAP is a strong authentication method used in point-to-point for user login. It's a type of authentication in which the authentication server sends the client a key to be used for encrypting the username and password. CHAP enables the username and password to be transmitted in an encrypted form for protection.

To use CHAP authentication, follow the steps below.

1. Click "Authenticate ●".
2. Select **"CHAP"**.



Authentication : None

Figure 3.5.3.7

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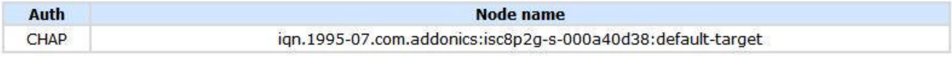
3. Click "Confirm ●".



Auth	Node name
CHAP	iqn.1995-07.com.addonics:isc8p2g-s-000a40d38:default-target

Figure 3.5.3.8

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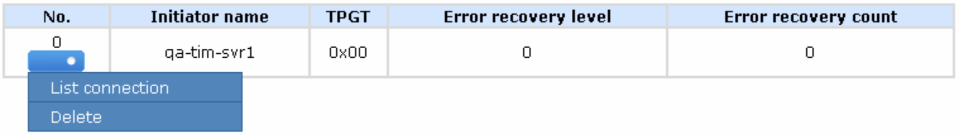
4. Go to **"/ iSCSI configuration / CHAP account "** page to create CHAP account. Refer to next section for more detail.
5. In **"Authenticate"** page, select **"None"** to disable CHAP.

Tips
After setting CHAP, the initiator in host/server should be set the same CHAP account. Otherwise, user cannot login.

3.5.4 Session

"Session" can display iSCSI session and connection information, including the following items:

1. Host (Initiator Name)
2. Error Recovery Level
3. Error Recovery Count
4. Detail of Authentication status and Source IP: port number.

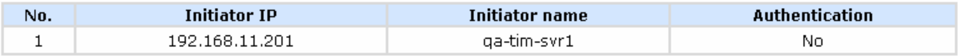


No.	Initiator name	TPGT	Error recovery level	Error recovery count
0	qa-tim-svr1	0x00	0	0

Figure 3.5.4.1

(Figure 3.5.4.1: iSCSI Session.)

To view more information, move cursor to the gray button of session number, click **"List connection"**. It will list all connection(s) of the session.



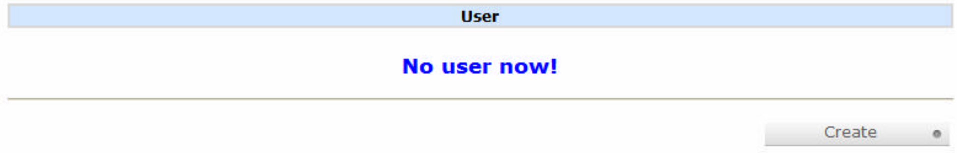
No.	Initiator IP	Initiator name	Authentication
1	192.168.11.201	qa-tim-svr1	No

Figure 3.5.4.2

(Figure 3.5.4.2: iSCSI Connection.)

3.5.5 CHAP account

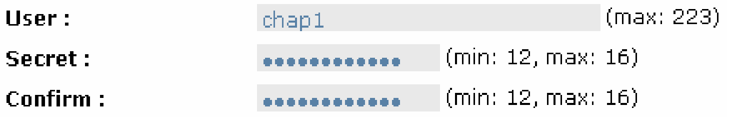
"CHAP account" allows you to manage a CHAP account for authentication. **ISC8P2G-S** can create one CHAP only.



User
No user now!

To setup CHAP account, follow the steps below.

1. Click " Create ".
2. Enter **"User"**, **"Secret"**, and **"Confirm"** secret again.



User : chap1 (max: 223)

Secret : ●●●●●●●●●●●● (min: 12, max: 16)

Confirm : ●●●●●●●●●●●● (min: 12, max: 16)

Figure 3.5.5.3

3. Click “Confirm”.

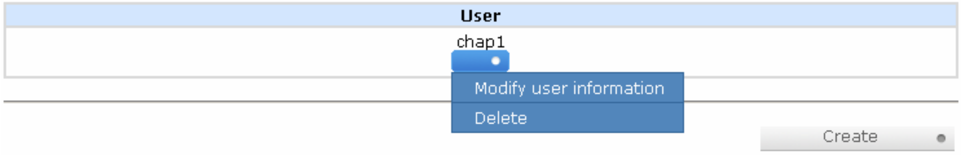


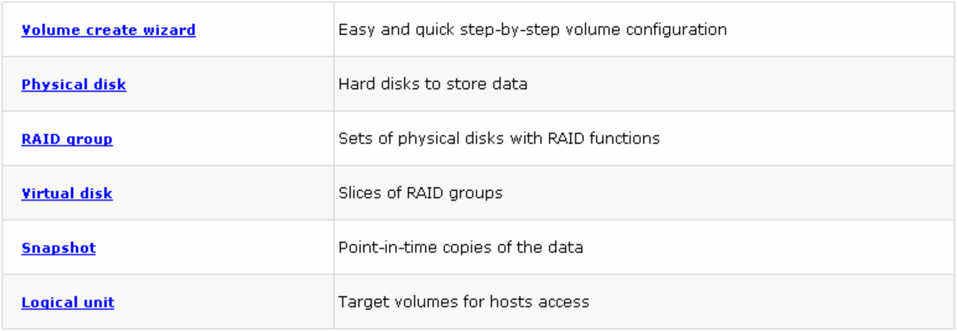
Figure 3.5.5.4

(Figure 3.5.5.4: created a CHAP account named “chap1”.)

4. Click **“Delete”** to delete CHAP account.

3.6 Volume configuration

“Volume configuration” is designed for setting up volume configuration information which includes **“Volume create wizard”**, **“Physical disk”**, **“RAID group”**, **“Virtual disk”**, **“Snapshot”,** and **“Logical unit”**.



Volume create wizard	Easy and quick step-by-step volume configuration
Physical disk	Hard disks to store data
RAID group	Sets of physical disks with RAID functions
Virtual disk	Slices of RAID groups
Snapshot	Point-in-time copies of the data
Logical unit	Target volumes for hosts access

Figure 3.6.1

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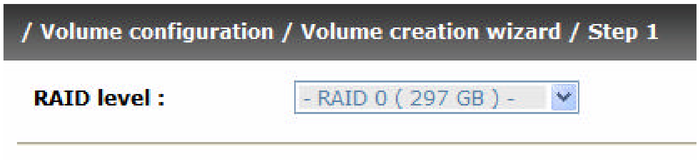
3.6.1 Volume creation wizard

The **"Volume creation wizard "** has a smart policy. When the system is full, meaning all 8 HDD are connected, and all HDD have the same size, ISC8P2G-S's Quick Install function lists all possible configurations and sizes among different RAID level options. The ISC8P2G -S Quick Installation will use all available HDD for the RAID level which the user decides.

But when the system is inserted with different sizes of HDD, e.g., 6*200G HDD and 2*80G, ISC8P2G -S also lists all possible combinations of different RAID Level and different sizes and you may observe there are some HDD not used (Free Status).

Step 1: Click **"Quick installation"**, then choose the RAID level. After choosing the RAID level, then click "Next >>". It will link to another page.


/ Volume configuration / Volume creation wizard / Step 1

RAID level : - RAID 0 (297 GB) -

Figure 3.3.1

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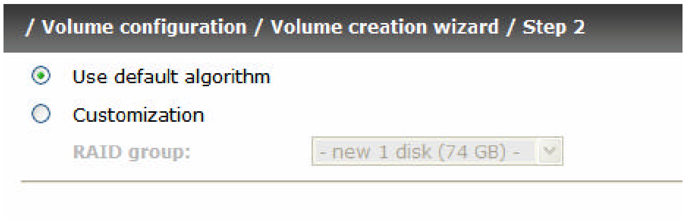
Step 2: Click "Next >>" to use default algorithm.

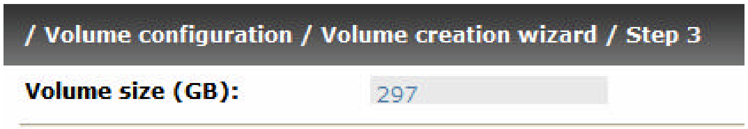

/ Volume configuration / Volume creation wizard / Step 2

● Use default algorithm

○ Customization

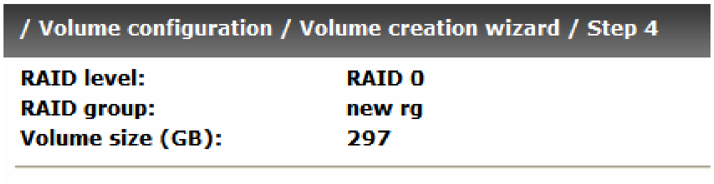
RAID group: - new 1 disk (74 GB) -

Step 3: Click "Next >>" to select the default volume size.


/ Volume configuration / Volume creation wizard / Step 3

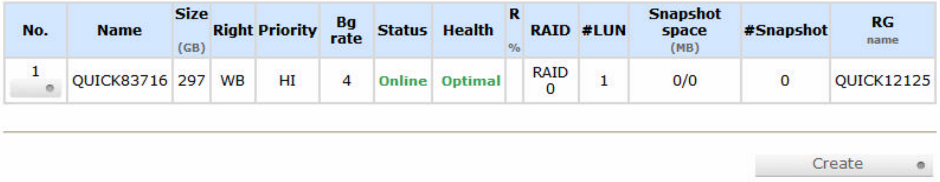
Volume size (GB): 297

Step 4: Confirm page. Click "Confirm" if all setups are correct. Then a VD will be created.


/ Volume configuration / Volume creation wizard / Step 4

RAID level:	RAID 0
RAID group:	new rg
Volume size (GB):	297

Done. You can start to use the system now.



No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name
1	QUICK83716	297	WB	HI	4	Online	Optimal		RAID 0	1	0/0	0	QUICK12125

Figure 3.3.2

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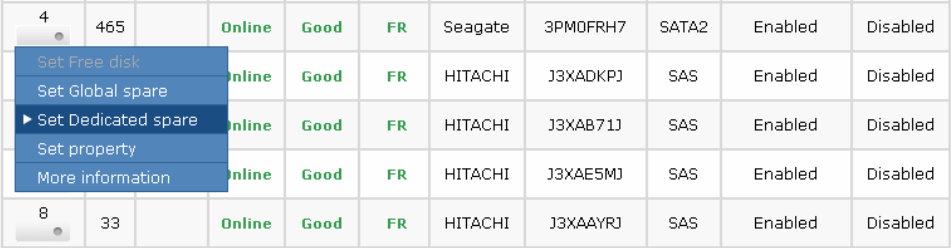
3.6.2 Physical disk

"Physical disk" allows you to view the status of hard drives in the system. The followings are operational tips:

1. Move the cursor to the gray button next to the drive number under Slot. It will show the functions that can be executed.
2. Active functions can be selected, but inactive functions will be grayed out.

For example, set PD slot number 11 to dedicated spare disk.

Step 1: Move the cursor to the gray button of PD 11, select **"Set Dedicated spare"**, it will link to next page.



4	465		Online	Good	FR	Seagate	3PM0FRH7	SATA2	Enabled	Disabled
			nline	Good	FR	HITACHI	J3XADKPJ	SAS	Enabled	Disabled
			nline	Good	FR	HITACHI	J3XAB71J	SAS	Enabled	Disabled
			nline	Good	FR	HITACHI	J3XAE5MJ	SAS	Enabled	Disabled
8	33		Online	Good	FR	HITACHI	J3XAAYRJ	SAS	Enabled	Disabled

Figure 3.6.2.1

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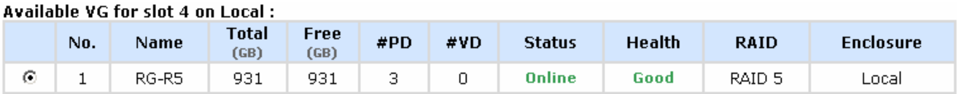
Step 2: Select the RGs which you want this drive to be set as a dedicated spare disk, then click “ Confirm ”.



Available VG for slot 4 on Local :

	No.	Name	Total (GB)	Free (GB)	#PD	#VD	Status	Health	RAID	Enclosure
●	1	RG-R5	931	931	3	0	Online	Good	RAID 5	Local

Figure 3.6.2.2

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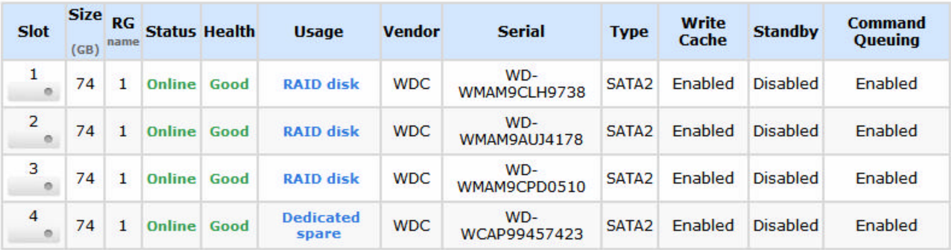
Done. View **“Physical disk”** page.



Slot	Size (GB)	RG name	Status	Health	Usage	Vendor	Serial	Type	Write Cache	Standby	Command Queuing
1	74	1	Online	Good	RAID disk	WDC	WD-WMAM9CLH9738	SATA2	Enabled	Disabled	Enabled
2	74	1	Online	Good	RAID disk	WDC	WD-WMAM9AUJ4178	SATA2	Enabled	Disabled	Enabled
3	74	1	Online	Good	RAID disk	WDC	WD-WMAM9CPD0510	SATA2	Enabled	Disabled	Enabled
4	74	1	Online	Good	Dedicated spare	WDC	WD-WCAP99457423	SATA2	Enabled	Disabled	Enabled

Figure 3.6.2.3

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(Figure 3.6.2.3: Physical disks of slot 1,2,3 are created for a RG named “RG-R5”. Slot 4 is set as dedicated spare disk of RG named “RG-R5”. The others are free disks.)

- **PD column description:**

Slot	The position of the hard drives. The button next to the number of slot shows the functions which can be executed.
Size (GB)	Capacity of hard drive.
RG Name	Related RAID group name.
Status	The status of hard drive. **“Online”** à the hard drive is online. **“Rebuilding”** à the hard drive is being rebuilt. **“Transition”** à the hard drive is being migrated or is replaced by another disk when rebuilding occurs. **“Missing”** à the hard drive has already joined a RG but not plugged into the disk tray of current system.

Health	The health of hard drive. **“Good”** à the hard drive is good. **“Failed”** à the hard drive failed. **“Error Alert”** à S.M.A.R.T. error alert. **“Read Errors”** à the hard drive has unrecoverable read errors.
Usage	**“RD”** à **R**AID **D**isk. This hard drive has been set to RAID. **“FR”** à **FR**ee disk. This hard drive is free for use. **“DS”** à **D**edicated **S**pare. This hard drive has been set to the dedicated spare of the RG. **“GS”** à **G**lobal **S**pare. This hard drive has been set as a global spare of all RGs. **“RS”** à **R**e**S**erve. The hard drive contains the RG information but cannot be used. It may be caused by an uncompleted RG set, or hot-plugging of this disk while there is data transfer. In order to protect the data in the disk, the status changes to reserve. It can be reused after setting it to “FR” manually.
Vendor	Hard drive vendor.
Serial	Hard drive serial number.
Type	Hard drive type. **“SATA”** à SATA disk. **“SATA2”** à SATA II disk. **“SAS”** à SAS disk.
Write cache	Hard drive write cache is enabled or disabled.
Standby	HDD auto spin down to save power. The default value is disabled.

- **PD operations description:**

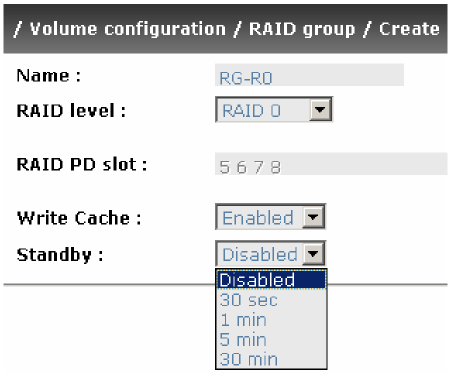
Set Free disk	Make the selected hard drive to be free for use.

Set Global spare	Set the selected hard drive to global spare of all RGs.
Set Dedicated spares	Set hard drive to dedicated spare of selected RGs.
Set property	Change the status of write cache and standby . Write cache options: **“Enabled”** à Enable disk write cache . **“Disabled”** à Disable disk write cache. Standby options: **“Disabled”** à Disable spindown . **“30 sec / 1 min / 5 min / 30 min ”** à Enable hard drive auto spindown to save power.
More information	Shows hard drive detailed information.

3.6.3 RAID group

“RAID group” allows you to view the status of each RAID group. The following is an example to create a RG.

Step 1: Click “Create ●”, enter **“Name”**, choose **“RAID level”**, click “Select PD ●” to select PD. Then click “Next >> ●”.


/ Volume configuration / RAID group / Create

Name : RG-R0

RAID level : RAID 0

RAID PD slot : 5 6 7 8

Write Cache : Enabled

Standby : Disabled

Figure 3.6.3.1

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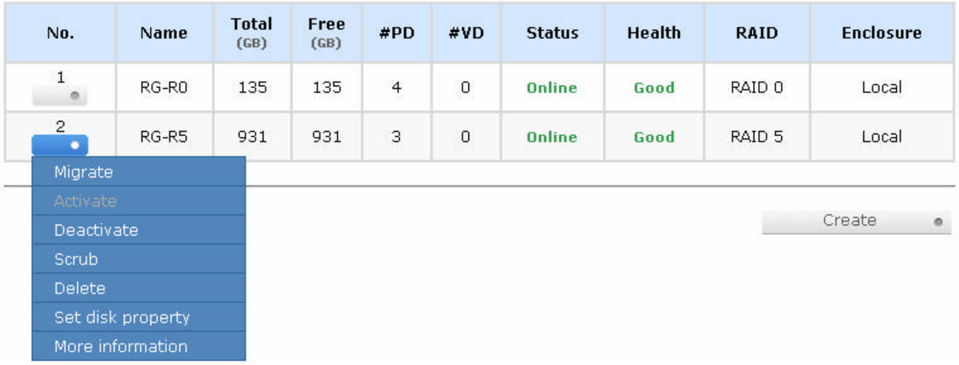
Step 2: Confirm page. Click "Confirm" if all setups are correct .



No.	Name	Total (GB)	Free (GB)	#PD	#VD	Status	Health	RAID	Enclosure
1	RG-R0	135	135	4	0	Online	Good	RAID 0	Local
2	RG-R5	931	931	3	0	Online	Good	RAID 5	Local

Figure 3.6.3.2

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(Figure 3.6.3.2: There is a RAID 0 with 4 physical disks, named "RG-R0", total size is 135GB. Another is a RAID 5 with 3 physical disks, named "RG-R5".)

Done. View **"RAID group"** page.

- **RG column description:**

No.	Number of RAID group. The button next to the No. shows the function which can be executed.
Name	RAID group name.
Total(GB)	Total capacity of this RAID group.
Free(GB)	Free capacity of this RAID group.
#PD	The number of physical disks in RAID group.
#VD	The number of virtual disks in RAID group.
Status	The status of RAID group. **"Online"** à the RAID group is online. **"Offline"** à the RAID group is offline. **"Rebuild"** à the RAID group is rebuilding .

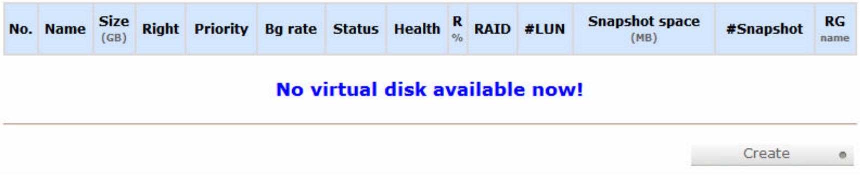
	“Migrate” à the RAID group is being migrated. **“Scrub”** à the RAID group is being scrubbed.
Health	The health of RAID group. **“Good”** à the RAID group is good. **“Failed”** à a hard drive failed. **“Degraded”** à RAID volume failure. The reason could be disk failure.
RAID	The RAID level of the RAID group.

- **RG operations description:**

Create	Create a RAID group.
Migrate	Migrate a RAID group. Refer to next chapter for more detail.
Activate	Activate a RAID group; it can be executed when RG status is offline. This is for online roaming purpose.
Deactivate	Deactivate a RAID group; it can be executed when RG status is online. This is for online roaming purpose.
Scrub	Scrub a RAID group. It’s a parity regeneration. It supports RAID 3 / 5 / 6 / 30 / 50 / 60 only.
Delete	Delete a RAID group.
Set disk property	Change the disk status of write cache and standby . Write cache options: **“Enabled”** à Enable disk write cache. **“Disabled”** à Disable disk write cache. Standby options: **“Disabled”** à Disable spindown. **“30 sec / 1 min / 5 min / 30 min ”** à Enable hard drive auto spindown to save power.
More information	Show RAID group detailed information.

3.6.4 Virtual disk

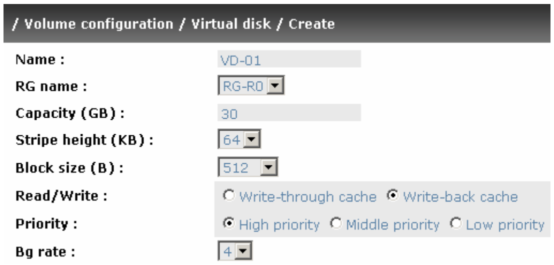
“Virtual disk” allows you to view the status of each Virtual disk. The following is an example to create a VD.



No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name

No virtual disk available now!

Step 1: Click “Create”, enter **“Name”**, choose **“RG name”**, **“Stripe height (KB)”**, **“Block size (B)”**, **“Read/Write”** mode, **“Priority”**, **“Bg rate”** (Background task priority), change **“Capacity (GB)”** if necessary. Then click “Confirm”.



/ Volume configuration / Virtual disk / Create

Name :	VD-01
RG name :	RG-R0
Capacity (GB) :	30
Stripe height (KB) :	64
Block size (B) :	512
Read/Write :	○ Write-through cache ● Write-back cache
Priority :	● High priority ○ Middle priority ○ Low priority
Bg rate :	4

Figure 3.6.4.1

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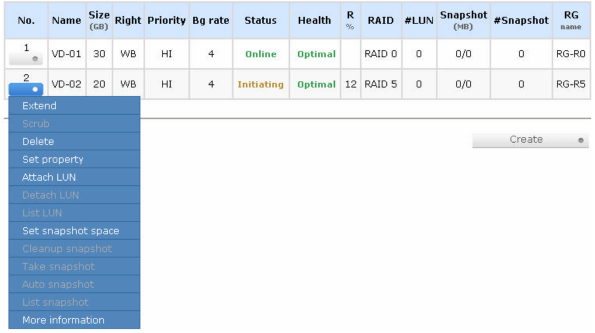
Step 2: Confirm page. Click “Confirm” if all setups are correct.



No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot (MB)	#Snapshot	RG name
1	VD-01	30	WB	HI	4	Online	Optimal		RAID 0	0	0/0	0	RG-R0
2	VD-02	20	WB	HI	4	Initiating	Optimal	12	RAID 5	0	0/0	0	RG-R5

Extend
Scrub
Delete
Set property
Attach LUN
Detach LUN
List LUN
Set snapshot space
Cleanup snapshot
Take snapshot
Auto snapshot
List snapshot
More information
Create

Figure 3.6.4.2

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(Figure 3.6.4.2: Create a VD named “VD-01”, related to “RG-R0”, size is 30GB. The other VD is named “VD-02”, initializing to 12%.)

Done. View **"Virtual disk"** page.

- **VD column description:**

No.	Number of this Virtual disk. The button next to the VD No. shows the functions which can be executed.
Name	Virtual disk name.
Size(GB)	Total capacity of the Virtual disk.
Right	**"WT"** à **W**rite **T**hrough. **"WB"** à **W**rite **B**ack. **"RO"** à **R**ead **O**nly.
Priority	**"HI"** à **HI**gh priority. **"MD"** à **M**i**D** priority. **"LO"** à **LO**w priority.
Bg rate	Background task priority. **"4 / 3 / 2 / 1 / 0"** à Default value is 4. The higher number the background priority of a VD has, the more background I/O will be scheduled to execute.
Status	The status of Virtual disk. **"Online"** à the Virtual disk is online. **"Offline"** à the Virtual disk is offline. **"Initiating"** à the Virtual disk is being initialized. **"Rebuild"** à the Virtual disk is being rebuilt. **"Migrate"** à the Virtual disk is being migrated. **"Rollback"** à the Virtual disk is being rolled back. **"Scrub"** à the Virtual disk is being scrubbed.

Health	The health of Virtual disk. **“Optimal”** à the Virtual disk is operating and has experienced no disk failures that would compromise the RG. **“Degraded”** à At least one disk which is part of the Virtual disk has been marked as failed or has been unplugged. **“Missing”** à the Virtual disk has been marked as missing by the system. **“Failed”** à the Virtual disk has experienced enough disk failures that would compromise the VD for unrecoverable data loss to occur. **“Part optimal”** à the Virtual disk has experienced disk failures.
R %	Ratio of initializing or re building.
RAID	The level of RAID that the Virtual disk is using.
#LUN	Number of LUN (s) that the Virtual disk is attached to.
Snapshot (MB)	The Virtual disk size used for snapshot. The number means **“Used snapshot space” / “Total snapshot space”**. The unit is in MegaBytes (MB).
#Snapshot	Number of snapshot(s) that the Virtual disk has taken.
RG name	The Virtual disk’s RG name

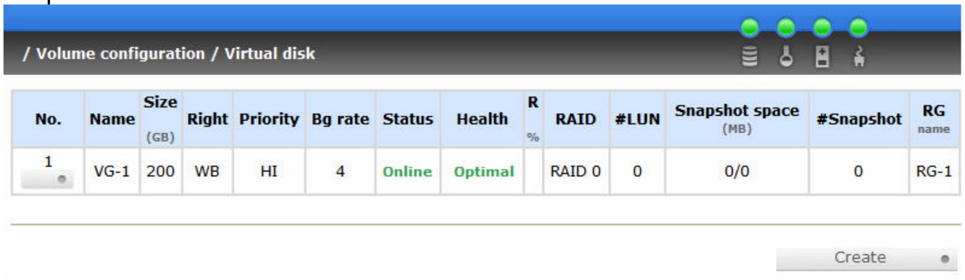
- **VD operations description:**

Extend	Extend a Virtual disk capacity.
Scrub	Scrub a Virtual disk. It’s a parity regeneration. It supports RAID 3 / 5 / 6 / 30 / 50 / 60 only.
Delete	Delete a Virtual disk.

Set property	Change the VD name, access rights, priority and bg rate. Access Rights options: **“WT”** à **W**rite **T**hrough. **“WB”** à **W**rite **B**ack. **“RO”** à **R**ead **O**nly. Priority options: **“HI”** à **HI**gh priority. **“MD”** à **M**i**D** priority. **“LO”** à **LO**w priority. Bg rate options: **“4 / 3 / 2 / 1 / 0”** à Default value is 4. The higher number the background priority of a VD has, the more background I/O will be scheduled to execute.
Attach LUN	Attach to a LUN.
Detach LUN	Detach to a LUN.
List LUN	List attached LUN(s).
Set snapshot space	Set snapshot space for executing snapshot. Refer to next chapter for more detail.
Cleanup snapshot	Clean all snapshot VD related to the Virtual disk and release snapshot space.
Take snapshot	Take a snapshot on the Virtual disk.
Auto snapshot	Set auto snapshot on the Virtual disk .
List snapshot	List all snapshot VD related to the Virtual disk.
More information	Show Virtual disk detail information.

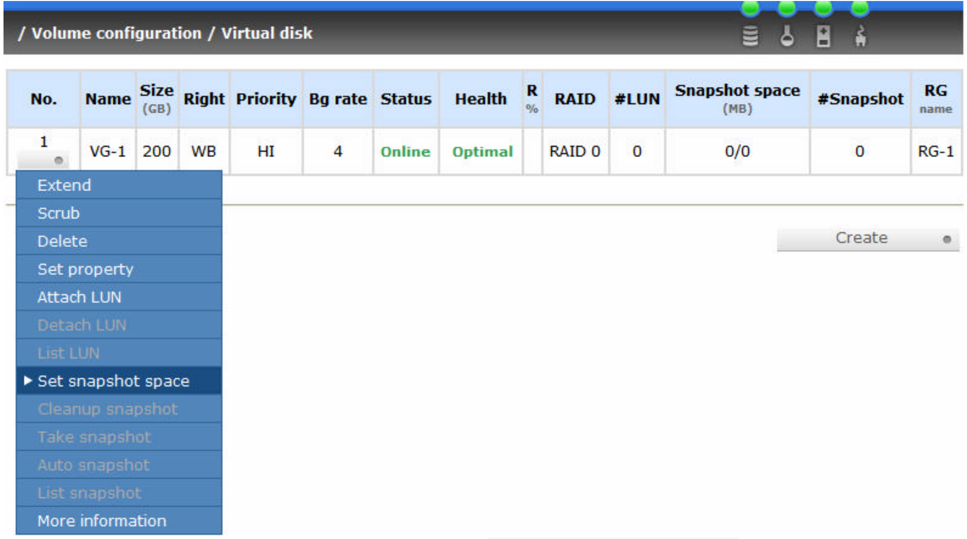
3.6.5 Snapshot

“Snapshot” allow you to view the status of snapshot. Refer to next chapter for more detail about snapshot concept. The following is an example to create a snapshot.


/ Volume configuration / Virtual disk
Create

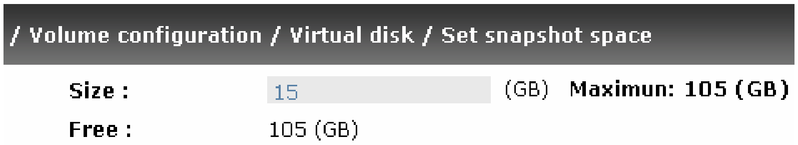
No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name
1	VG-1	200	WB	HI	4	Online	Optimal		RAID 0	0	0/0	0	RG-1

Step 1: Create snapshot space. In **“/ Volume configuration / Virtual disk”**, move cursor to the gray button next to the VD number; click **“Set snapshot space”**.


/ Volume configuration / Virtual disk
Extend
Scrub
Delete
Set property
Attach LUN
Detach LUN
List LUN
Set snapshot space
Cleanup snapshot
Take snapshot
Auto snapshot
List snapshot
More information
Create

No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name
1	VG-1	200	WB	HI	4	Online	Optimal		RAID 0	0	0/0	0	RG-1

Step 2: Set snapshot space. Then click “Confirm”. The snapshot space is created.


/ Volume configuration / Virtual disk / Set snapshot space

Size : 15 (GB) Maximun: 105 (GB)

Free : 105 (GB)

Figure 3.6.5.1

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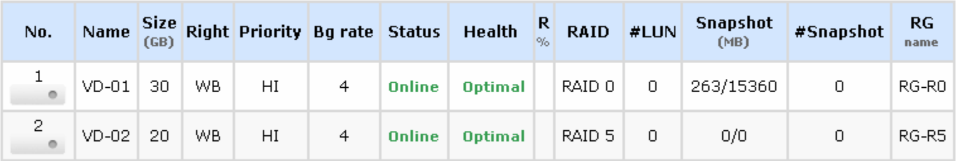

No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot (MB)	#Snapshot	RG name
1	VD-01	30	WB	HI	4	Online	Optimal		RAID 0	0	263/15360	0	RG-R0
2	VD-02	20	WB	HI	4	Online	Optimal		RAID 5	0	0/0	0	RG-R5

Figure 3.6.5.2

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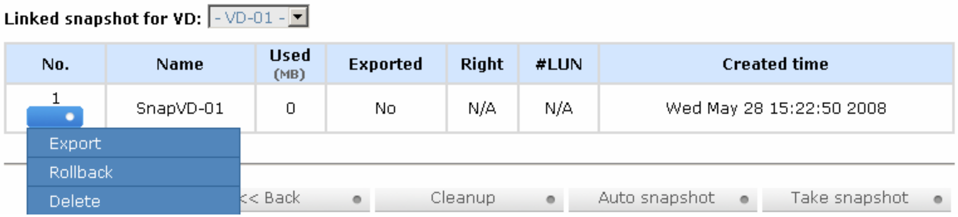
(Figure 3.6.5.2: "VD-01" snapshot space has been created, snapshot space is 15360MB, and used 263MB for saving snapshot index.)

Step 3: Take a snapshot. In **"/ Volume configuration / Snapshot"**, click "Take snapshot ●". It will link to next page. Enter a snapshot name.



Linked snapshot for VD: - VD-01 -

No.	Name	Used (MB)	Exported	Right	#LUN	Created time
1	SnapVD-01	0	No	N/A	N/A	Wed May 28 15:22:50 2008

Figure 3.6.5.3

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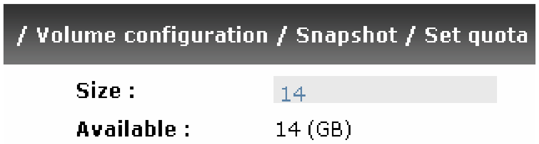
Step 4: Export the snapshot VD. Move cursor to the gray button next to the Snapshot VD number; click **"Export"**. Enter a capacity for snapshot VD. If size is zero, the exported snapshot VD will be read only. Otherwise, the exported snapshot VD can be read/written, and the size will be the maximum capacity to read/write.



/ Volume configuration / Snapshot / Set quota

Size : 14

Available : 14 (GB)

Figure 3.6.5.4

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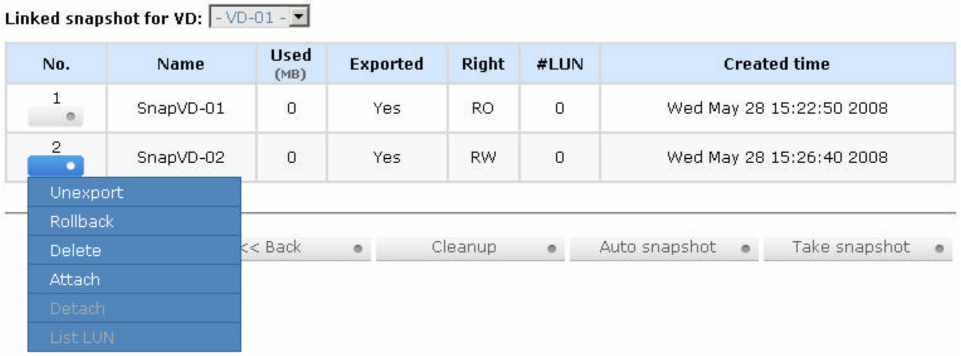

Linked snapshot for VD: - VD-01 -

No.	Name	Used (MB)	Exported	Right	#LUN	Created time
1	SnapVD-01	0	Yes	RO	0	Wed May 28 15:22:50 2008
2	SnapVD-02	0	Yes	RW	0	Wed May 28 15:26:40 2008

Figure 3.6.5.5

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(Figure 3.6.5.5: This is the list of "VD-01". There are two snapshots in "VD-01". Snapshot VD "SnapVD-01" is exported to read only, "SnapVD-02" is exported to read/write.)

Step 5: Attach a LUN for snapshot VD. Refer to the next section for attaching a LUN.

Done. Snapshot VD can be used.

- **Snapshot column description:**

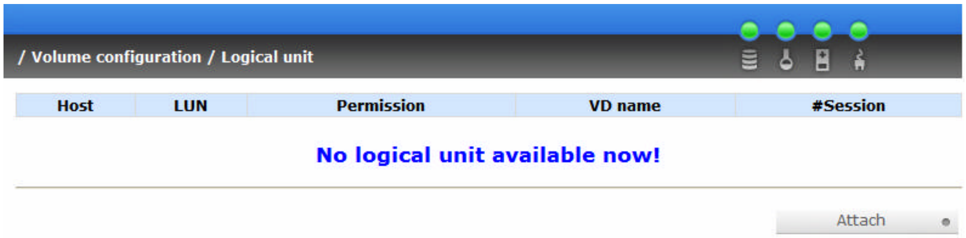
No.	Number of this snapshot VD. The button next to the snapshot VD No. showS the functions which can be executed.
Name	Snapshot VD name.
Used (MB)	The amount of snapshot space that has been used.
Exported	Snapshot VD is exported or not.
Right	**"RW"** à **R**ead **/ W**rite. The snapshot VD can be read / written to. **"RO"** à **R**ead **O**nly. The snapshot VD can be read only.
#LUN	Number of LUN(s) that snapshot VD is attached to.
Created time	Snapshot VD created time.

- **Snapshot operations description:**

Export	Export the snapshot VD.
Rollback	Rollback the snapshot VD to the original.
Delete	Delete the snapshot VD.
Attach	Attach to a LUN.
Detach	Detach to a LUN.
List LUN	List attached LUN(s).

3.6.6 Logical unit

“Logical unit” allow you to view the status of attached logical unit number of each VD.

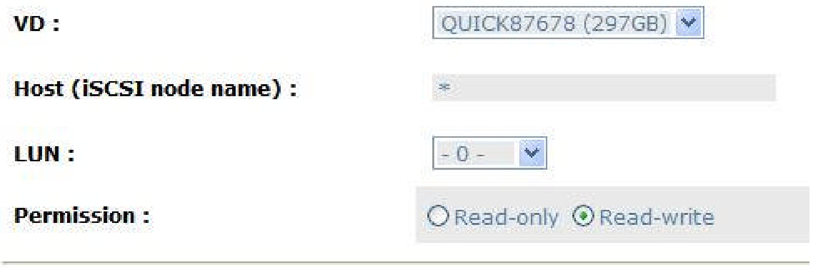


/ Volume configuration / Logical unit

Host	LUN	Permission	VD name	#Session

No logical unit available now!

User can attach LUN by clicking the “ Attach ”. **“Host”** must enter an iSCSI node name for access control, or fill -in wildcard **“*”,** which means every host can access the volume. Choose LUN number and permission, then click “ Confirm ”.



VD :	QUICK87678 (297GB)
Host (iSCSI node name) :	*
LUN :	- 0 -
Permission :	○ Read-only ● Read-write

Figure 3.6.6.1

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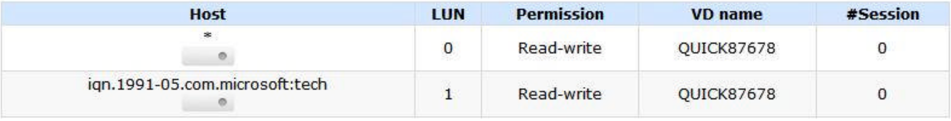

Host	LUN	Permission	VD name	#Session
*	0	Read-write	QUICK87678	0
iqn.1991-05.com.microsoft:tech	1	Read-write	QUICK87678	0

Figure 3.6.6.2

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(Figure 3.6.6.2: ISC8P2G-S, QUICK87678 is attached to LUN 0 and every host can access. QUICK87678 is attached to LUN 1 and only initiator note which is named "iqn.1991-05.com.microsoft:tech" can access. The other models do not display "Target" column.)

- **LUN operations description:**

Attach	Attach a logical unit number to a Virtual disk.
Detach	Detach a logical unit number from a Virtual disk.

The rules of access control are rated in importance from top to bottom of the list. For example: there are 2 rules for the same VD, one is "*", LUN 0; and the other is "iqn.host1", LUN 1. The other host "iqn.host2" can login successfully because it matches the rule 1.

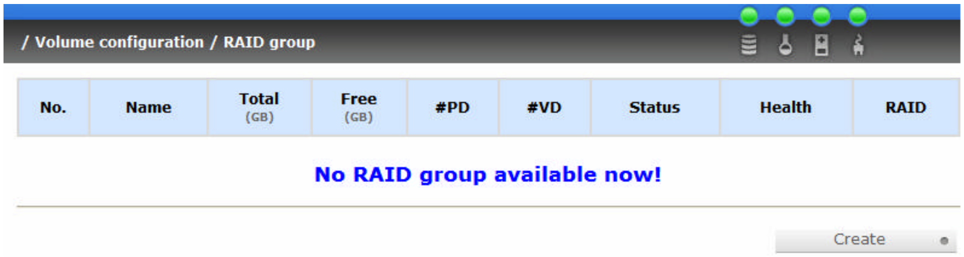
The access will be denied when there is no matching rule.

3.6.7 Example

The following is an example for creating volumes. Example 1 is to create two VDs and set a global spare disk.

- **Example 1**

Example 1 is to create two VDs in one RG, each VD uses global cache volume. Global cache volume is created after system boots up automatically. So, no action is needed to set CV. Then set a global spare disk. Eventually, delete all of them.

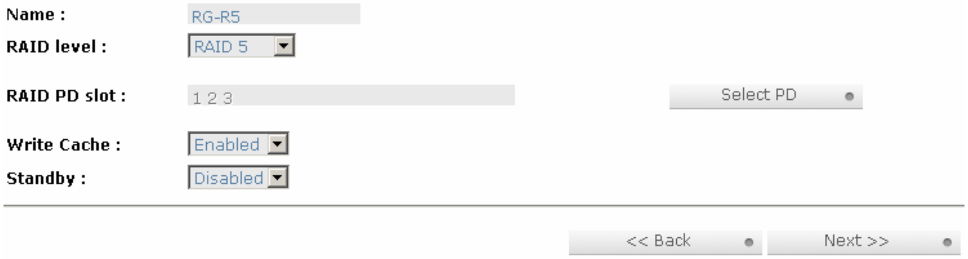


No.	Name	Total (GB)	Free (GB)	#PD	#VD	Status	Health	RAID

No RAID group available now!

Step 1: Create RG (RAID group).

To create the RAID group, follow the steps below:



Name : RG-R5
RAID level : RAID 5
RAID PD slot : 1 2 3
Write Cache : Enabled
Standby : Disabled

Figure 3.6.7.1

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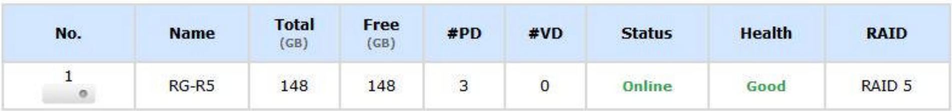
1. Select **"/ Volume configuration / RAID group"** .
2. Click " Create ".
3. Input a RG Name, choose a RAID level from the list, click " Select PD " to choose the RAID PD slot(s), then click " Next >> ".
4. Check the outcome. Click " Confirm " if all setups are correct.
5. Done. A RG has been created.



No.	Name	Total (GB)	Free (GB)	#PD	#VD	Status	Health	RAID
1	RG-R5	148	148	3	0	Online	Good	RAID 5

Figure 3.6.7.2

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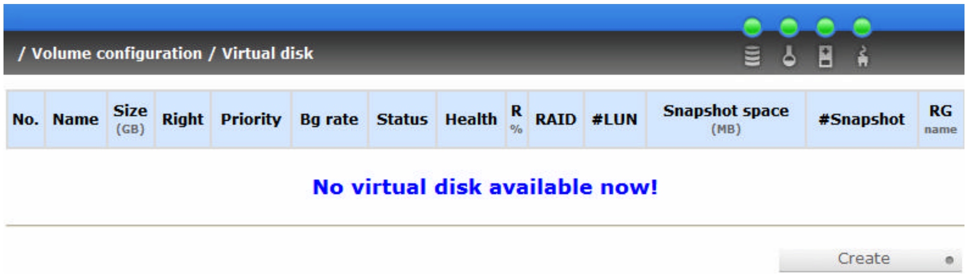
(Figure 3.6.7.2: Creating a RAID 5 with 3 physical disks, named "RG-R5". The total size is 148GB. Because there is no related VD, free size still remains 148GB.)

Step 2: Create VD (Virtual disk).

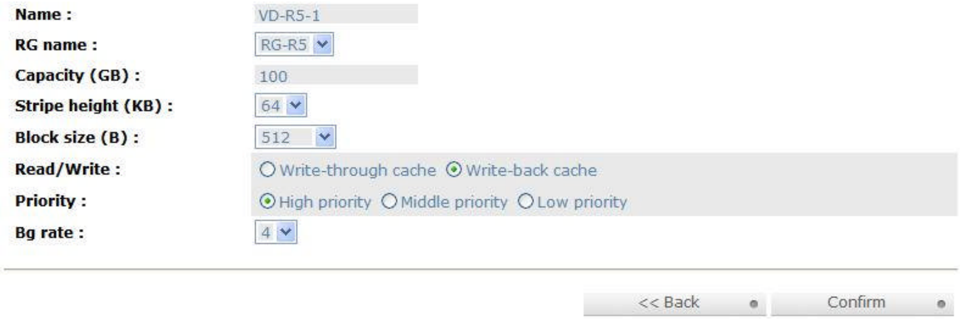


/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name

No virtual disk available now!

To create a data user volume, follow the steps below.



Name : VD-R5-1
RG name : RG-R5
Capacity (GB) : 100
Stripe height (KB) : 64
Block size (B) : 512
Read/Write : ○ Write-through cache ● Write-back cache
Priority : ● High priority ○ Middle priority ○ Low priority
Bg rate : 4

Figure 3.6.7.3

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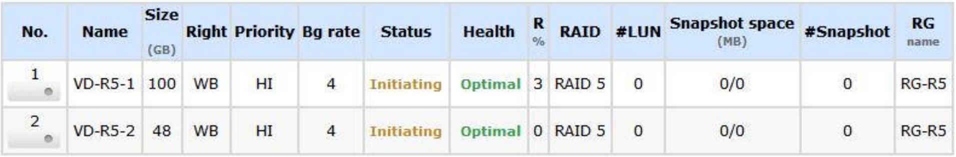
5. Select **"/ Volume configuration / Virtual disk"**.
6. Click "Create".
7. Input a VD name, choose a RG Name and enter a size of VD; decide the stripe high, block size, read/write mode and set priority, finally click "Confirm".
8. Done. A VD has been created.
9. Do one more time to create another VD.



No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name
1	VD-R5-1	100	WB	HI	4	Initiating	Optimal	3	RAID 5	0	0/0	0	RG-R5
2	VD-R5-2	48	WB	HI	4	Initiating	Optimal	0	RAID 5	0	0/0	0	RG-R5

Figure 3.6.7.4

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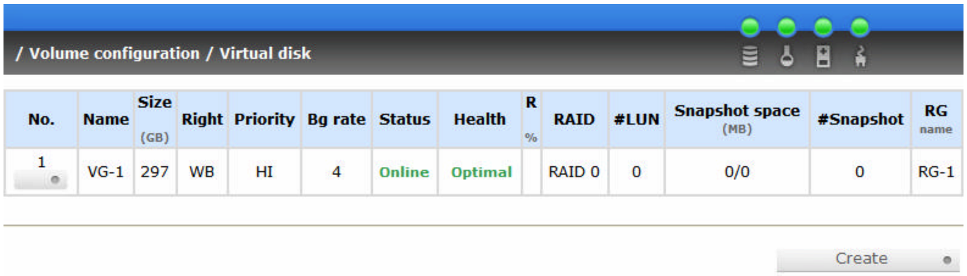
(Figure 3.6.7.4: Create VDs named "VD-R5-1" and "VD-R5-2". Regarding to "RG-R5", the size of "VD-R5-1" is 100GB, the size of "VD-R5-2" is 48GB. "VD-R5-1" is initialing about 3%. There is no LUN attached.)

Step 3: Attach LUN to VD.



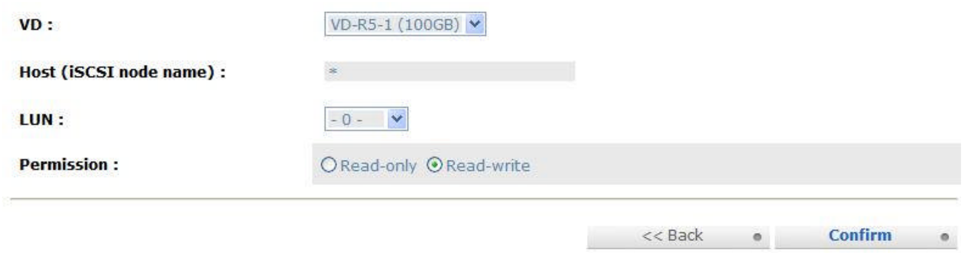
/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name
1	VG-1	297	WB	HI	4	Online	Optimal		RAID 0	0	0/0	0	RG-1

There are 2 methods to attach LUN to VD.

1. In **"/ Volume configuration / Virtual disk"**, move cursor to the gray button next to the VD number; click "Attach LUN".
2. In **"/ Volume configuration / Logical unit"**, click "Attach".

The procedures are as follows:



VD :	VD-R5-1 (100GB)
Host (iSCSI node name) :	*
LUN :	- 0 -
Permission :	○ Read-only ● Read-write

Figure 3.6.7.5

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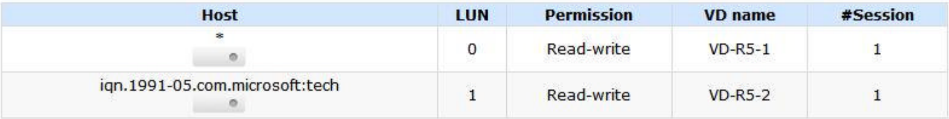
1. Select a VD.
2. Input **"Host"** name, which is a FC node name for access control, or fill-in wildcard **"*",** which means every host can access to this volume. Choose LUN and permission, then click "Confirm".
3. Done.



Host	LUN	Permission	VD name	#Session
*	0	Read-write	VD-R5-1	1
iqn.1991-05.com.microsoft:tech	1	Read-write	VD-R5-2	1

Figure 3.6.7.6

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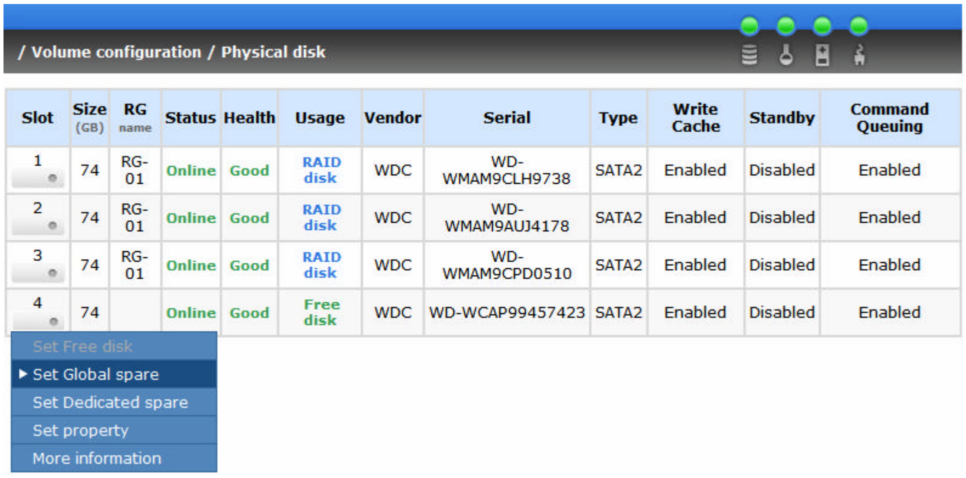
(Figure 3.5.8.6: VD-R5-1 is attached to LUN 0. VD-R5-2 is attached LUN 1.)

Tips
The rules of access control are rank in importance from top to bottom in the list.

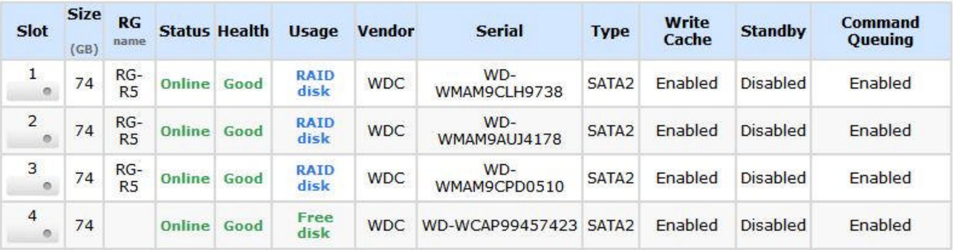
Step 4: Set global spare disk.


/ Volume configuration / Physical disk
Set Free disk
Set Global spare
Set Dedicated spare
Set property
More information

Slot	Size (GB)	RG name	Status	Health	Usage	Vendor	Serial	Type	Write Cache	Standby	Command Queuing
1	74	RG-01	Online	Good	RAID disk	WDC	WD-WMAM9CLH9738	SATA2	Enabled	Disabled	Enabled
2	74	RG-01	Online	Good	RAID disk	WDC	WD-WMAM9AUJ4178	SATA2	Enabled	Disabled	Enabled
3	74	RG-01	Online	Good	RAID disk	WDC	WD-WMAM9CPD0510	SATA2	Enabled	Disabled	Enabled
4	74		Online	Good	Free disk	WDC	WD-WCAP99457423	SATA2	Enabled	Disabled	Enabled

To set global spare disks, follow the steps below.

1. Select **"/ Volume configuration / Physical disk"**.
2. Move cursor to the gray button next to the PD slot; click **"Set Global spare"**.
3. **"GS"** icon is shown in **"Usage"** column.



Slot	Size (GB)	RG name	Status	Health	Usage	Vendor	Serial	Type	Write Cache	Standby	Command Queuing
1	74	RG-R5	Online	Good	RAID disk	WDC	WD-WMAM9CLH9738	SATA2	Enabled	Disabled	Enabled
2	74	RG-R5	Online	Good	RAID disk	WDC	WD-WMAM9AUJ4178	SATA2	Enabled	Disabled	Enabled
3	74	RG-R5	Online	Good	RAID disk	WDC	WD-WMAM9CPD0510	SATA2	Enabled	Disabled	Enabled
4	74		Online	Good	Free disk	WDC	WD-WCAP99457423	SATA2	Enabled	Disabled	Enabled

Figure 3.6.7.7

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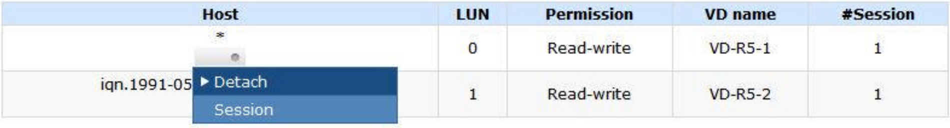
(Figure 3.5.8.7: Slot 4 is set as global spare disk.)

Step 5: Done. They can be used as disks.

Delete VDs, RG, follow the steps listed below.

Step 6: Detach LUN from VD.

In **"/ Volume configuration / Logical unit"**,



Host	LUN	Permission	VD name	#Session
*	0	Read-write	VD-R5-1	1
iqn.1991-05	1	Read-write	VD-R5-2	1

Figure 3.6.7.8

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1. Move cursor to the gray button next to the LUN; click **"Detach"**. There will pop up a confirmation page.
2. Choose "OK".
3. Done.

Step 7: Delete VD (Virtual disk).

To delete the Virtual disk, follow the procedures:

1. Select **"/ Volume configuration / Virtual disk"**.
2. Move cursor to the gray button next to the VD number; click **"Delete"**. There will pop up a confirmation page, click **"OK"**.
3. Done. Then, the VDs are deleted.

Tips
When deleting VD, the attached LUN(s) related to this VD will be detached automatically.

Step 8: Delete RG (RAID group).

To delete the RAID group, follow the steps below:

1. Select **"/ Volume configuration / RAID group"**.
2. Select a RG which is no VD related on this RG, otherwise the VD(s) on this RG must be deleted first.
3. Move cursor to the gray button next to the RG number click **"Delete"**.
4. There will pop up a confirmation page , click **"OK"**.
5. Done. The RG has been deleted.

> **Tips**
> The action of deleting one RG will succeed only when all of the related VD(s) are deleted in this RG. Otherwise, it will have an error when deleting this RG .

Step 9: Free global spare disk.

To free global spare disks, follow the steps below.

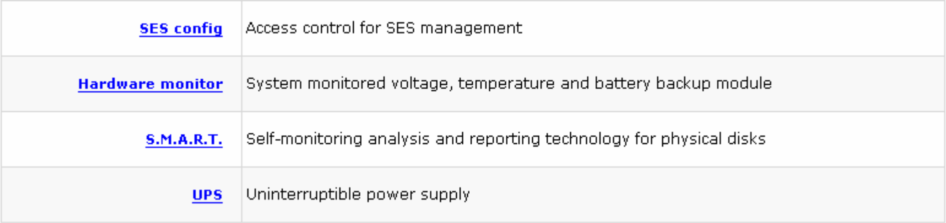
1. Select **"/ Volume configuration / Physical disk"**.
2. Move cursor to the gray button next to the PD slot; click **"Set Free disk"**.

Step 10: Done, all volumes have been deleted.

3.7 Enclosure management

The **“Enclosure management”** function allows managing the enclosure information including **“SES config”**, **“Hardware monitor”**, **“S.M.A.R.T.”** and **“UPS”**. The enclosure management provides sensors for different purposes, such as temperature sensors, voltage sensors, hard disks, fan sensors, power sensors, and LED status. And because the hardware characteristics are different among these sensors, different sensors have different polling intervals. Below are the details for the polling time intervals:

1. Temperature sensors: 1 minute.
2. Voltage sensors: 1 minute.
3. Hard disk sensors: 10 minutes.
4. Fan sensors: 10 seconds, when there are continuous 3 times of error, ISC8P2G-S sends ERROR event log.
5. Power sensors: 10 seconds, when there are continuous 3 times of error, ISC8P2G-S sends ERROR event log.
6. LED status: 10 seconds.

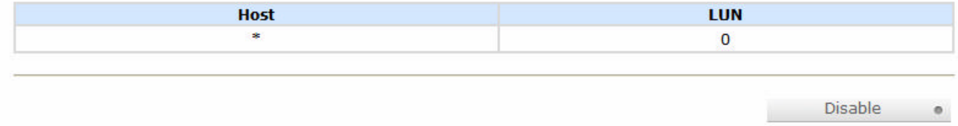


SES config	Access control for SES management
Hardware monitor	System monitored voltage, temperature and battery backup module
S.M.A.R.T.	Self-monitoring analysis and reporting technology for physical disks
UPS	Uninterruptible power supply

Figure 3.7.1

3.7.1 SES configuration

SES represents **S**CSI **E**nclosure **S**ervices, one of the enclosure management standards. The **“SES config”** function allows you to enable or disable the management of SES.



Host	LUN
*	0

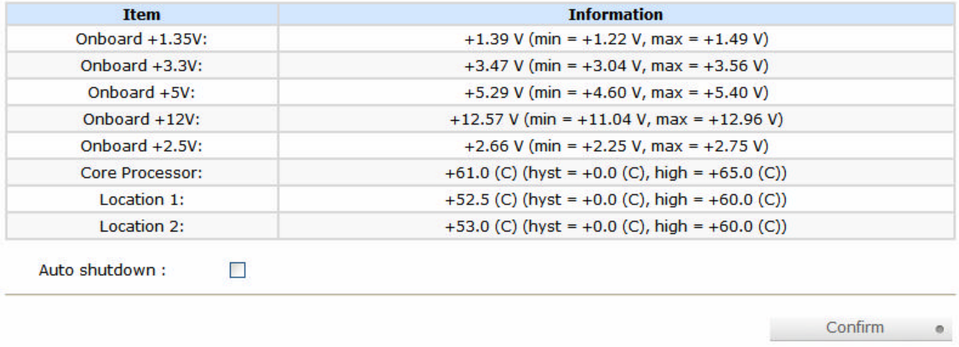
Figure 3.7.1.1

(Figure 3.7.1.1: Enable SES in LUN 0, and can be accessed from every host.)

The SES client software is available at the following web site:
SANtools: http://www.santools.com/

3.7.2 Hardware monitor

Select **“Hardware monitor”** function to view information on current voltage and temperature.



Item	Information
Onboard +1.35V:	+1.39 V (min = +1.22 V, max = +1.49 V)
Onboard +3.3V:	+3.47 V (min = +3.04 V, max = +3.56 V)
Onboard +5V:	+5.29 V (min = +4.60 V, max = +5.40 V)
Onboard +12V:	+12.57 V (min = +11.04 V, max = +12.96 V)
Onboard +2.5V:	+2.66 V (min = +2.25 V, max = +2.75 V)
Core Processor:	+61.0 (C) (hyst = +0.0 (C), high = +65.0 (C))
Location 1:	+52.5 (C) (hyst = +0.0 (C), high = +60.0 (C))
Location 2:	+53.0 (C) (hyst = +0.0 (C), high = +60.0 (C))

Auto shutdown : ☐

Figure 3.7.2.1

If **“Auto shutdown”** has been checked, the system will shutdown automatically when voltage or temperature is out of the normal range. For better data protection, check “**Auto Shutdown**”.

For better protection and to avoid single short period of high temperature triggering Auto shutdown, ISC8P2G-S uses multiple condition judgments for Auto shutdown. Below are the details of when the Auto shutdown will be triggered.

1. There are 3 sensors placed on the ISC8P2G-S for temperature checking of the core processor, on the PCI-X bridge, and on the daughter board. ISC8P2G-S will check each sensor every 30 seconds. When one of the sensor senses high temperature value for 3 minutes, the Auto shutdown will be triggered immediately.
2. The core processor temperature limit is 85 Ž. The PCI-X bridge temperature limit is 80 Ž. The daughter board temperature limit is 80 Ž.
3. If the high temperature situation doesn’t last for 3 minutes, ISC8P2G-S will not do auto shutdown.

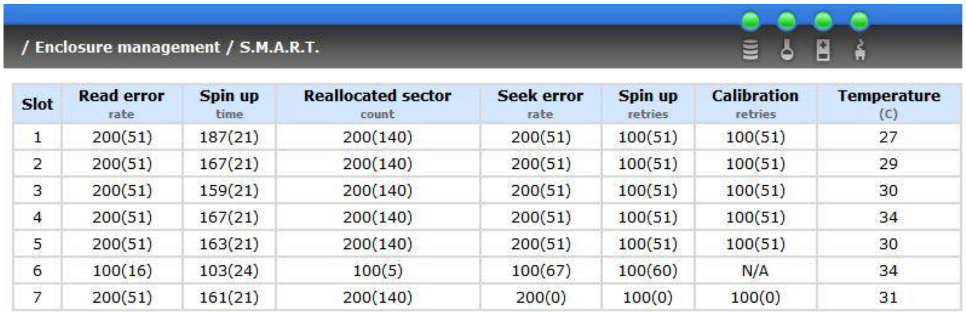
3.7.3 Hard drive S.M.A.R.T. function support

S.M.A.R.T. (**S**elf-**M**onitoring **A**nalysis and **R**eporting **T**echnology) is a diagnostic tool for hard drives to give advanced warning of drive failures. **S.M.A.R.T.** provides users a chance to take actions before possible drive failure.

S.M.A.R.T. measures many attributes of the hard drive all the time and determine the hard drives which are close to failure. The advanced identification of possible hard drive failures can allow users to back up hard drive or replace the hard drive.

The **"S.M.A.R.T."** function will display S.M.A.R.T. information of hard drives. The number value is the current value and the number in parenthesis is the threshold value. The threshold values of hard drive vendors are different; refer to vendors' specification for details.

S.M.A.R.T. information is only supported on SATA drive. SAS drive does not have S.M.A.R.T. information. It will show N/A in this web page.



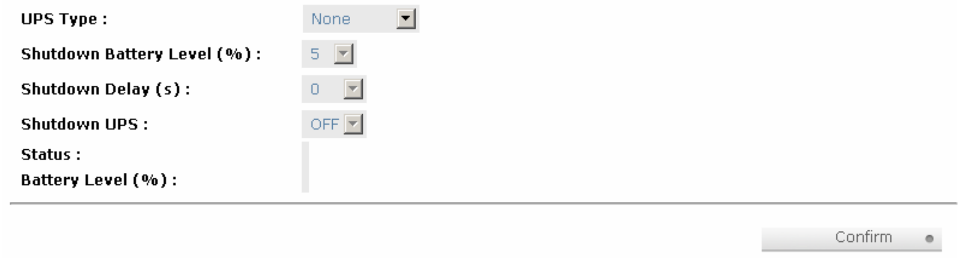
/ Enclosure management / S.M.A.R.T.

Slot	Read error rate	Spin up time	Reallocated sector count	Seek error rate	Spin up retries	Calibration retries	Temperature (C)
1	200(51)	187(21)	200(140)	200(51)	100(51)	100(51)	27
2	200(51)	167(21)	200(140)	200(51)	100(51)	100(51)	29
3	200(51)	159(21)	200(140)	200(51)	100(51)	100(51)	30
4	200(51)	167(21)	200(140)	200(51)	100(51)	100(51)	34
5	200(51)	163(21)	200(140)	200(51)	100(51)	100(51)	30
6	100(16)	103(24)	100(5)	100(67)	100(60)	N/A	34
7	200(51)	161(21)	200(140)	200(0)	100(0)	100(0)	31

Figure 3.7.3.1

3.7.4 UPS

Select **“UPS”** function. It will set UPS (**U**ninterruptible **P**ower **S**upply) parameters.



UPS Type : None

Shutdown Battery Level (%) : 5

Shutdown Delay (s) : 0

Shutdown UPS : OFF

Status :

Battery Level (%) :

Figure 3.7.4.1

Currently, the system only supports and communicates with smart-UPS function of APC (American Power Conversion Corp.) UPS. Check details from http://www.apc.com/.

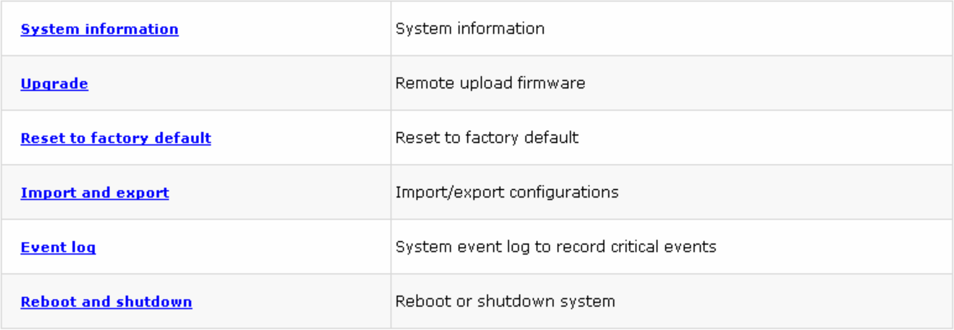
First, connect the system and APC UPS via RS-232. Then set up the shutdown value.

UPS Type	Select UPS Type. Choose Smart-UPS for APC. None for other vendors or no UPS.
Shutdown Battery Level (%)	When value is below the setting level, the system will shutdown. Setting level to **“0”** will disable UPS function.
Shutdown Delay (s)	If power failure has occurred, and the system cannot return to the set value on the set period, the system will shutdown. Setting delay to **“0”** will disable the function.
Shutdown UPS	Select ON. When power on the UPS is almost depleted, the UPS will shutdown by itself after the ISC8P2G-S shutdown successfully. After power comes back on, the UPS will start working and notify system to boot up. Selecting OFF will not turn off the UPS automatically.

Status	The status of UPS. **“Detecting…”** **“Running”** **“Unable to detect UPS ”** **“Communication lost ”** **“UPS reboot in progress ”** **“UPS shutdown in progress ”** **“Batteries failed. Please change them NOW! ”**
Battery Level (%)	Current percentage of battery level.

3.8 System maintenance

"Maintenance" allows the operation of system functions which include **"System information"** to show the system version, **"Upgrade"** to the latest firmware, **"Reset to factory default"** to reset all controller configuration values to factory settings, **"Import and export"** to import and export all controller configuration, **"Event log"** to view system event log to record critical events, and **"Reboot and shutdown"** to either reboot or shutdown the system.



System information	System information
Upgrade	Remote upload firmware
Reset to factory default	Reset to factory default
Import and export	Import/export configurations
Event log	System event log to record critical events
Reboot and shutdown	Reboot or shutdown system

Figure 3.8.1

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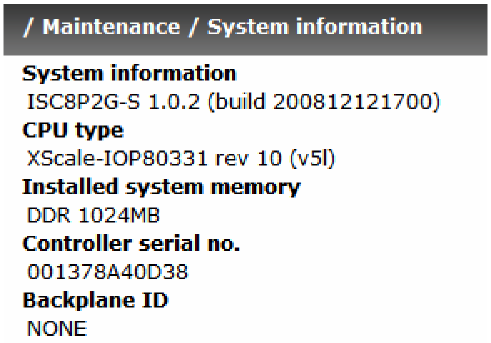
3.8.1 System information

"System information" can display system information (including firmware version), CPU type, installed system memory, and controller serial number.

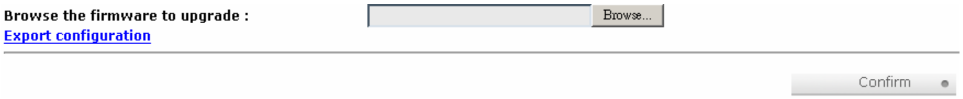


/ Maintenance / System information

System information
ISC8P2G-S 1.0.2 (build 200812121700)
CPU type
XScale-IOP80331 rev 10 (v5l)
Installed system memory
DDR 1024MB
Controller serial no.
001378A40D38
Backplane ID
NONE

3.8.2 Upgrade

“Upgrade” allow you to upgrade the firmware. Prepare new firmware file named **“xxxx.bin”** in local hard drive, then click “Browse...” to select the file. Click “Confirm”, it will pop up a message “Upgrade system now? If you want to downgrade to the previous FW later (not recommend), export your system configuration in advance”, click **“Cancel”** to export system configuration in advance, then click **“OK”** to start to upgrade firmware.


Browse the firmware to upgrade :

Export configuration

Figure 3.8.2.1

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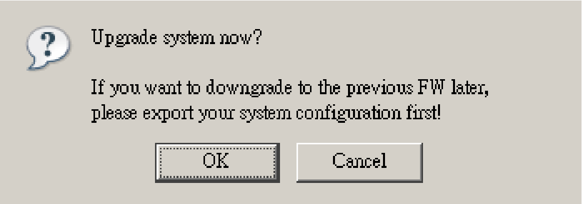
Upgrade system now?

If you want to downgrade to the previous FW later,
please export your system configuration first!

Figure 3.8.2.2

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When upgrading, there is a progress bar running. After upgrade is completed, the system must be manually rebooted to make the new firmware take effect.

3.8.3 Reset to factory default

“Reset to factory default” allows user to reset controller to factory default setting.

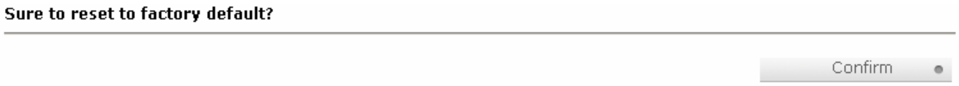

Sure to reset to factory default?

Figure 3.8.3.1

Reset to default value, the password is: **supervisor**, and IP address to default DHCP.

Examples:

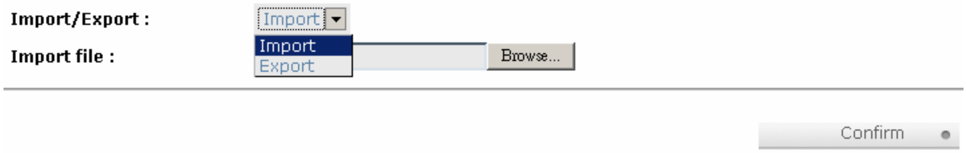
Default IP address: **192.168.10.50** (DHCP)

Default subnet mask: **255.255.255.0**

Default gateway: **192.168.10.254**

3.8.4 Import and export

“Import and export” allows user to save system configuration values.



Import/Export : Import

Import file :

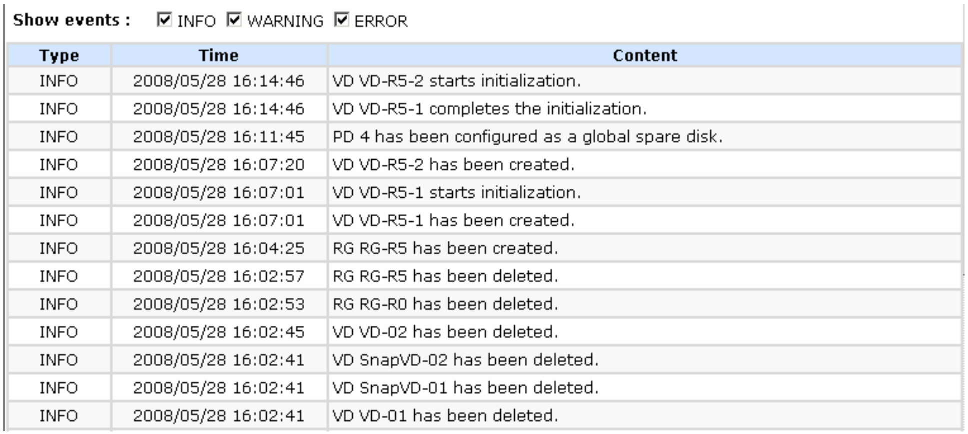
Figure 3.8.4.1

1. **Import:** Import all system configurations excluding volume configuration.
2. **Export:** Export all configurations to a file.

> **Caution**
> **“Import”** will import all system configurations excluding volume configuration; the current configurations will be replaced.

3.8.5 Event log

“Event log” allows you to view the event messages. Check the checkbox of INFO, WARNING, and ERROR to choose the level of display event log. Clicking “Download” button will save the whole event log as a text file with file name “log-ModelName-SerialNumber-Date-Time.txt” (e.g., log-ISC8P2G-S-20090123-145542.txt). Click ”Clear” button to clear event log. Click “Mute” button to stop alarm if there are system alerts.



Show events : ☑ INFO ☑ WARNING ☑ ERROR

Type	Time	Content
INFO	2008/05/28 16:14:46	VD VD-R5-2 starts initialization.
INFO	2008/05/28 16:14:46	VD VD-R5-1 completes the initialization.
INFO	2008/05/28 16:11:45	PD 4 has been configured as a global spare disk.
INFO	2008/05/28 16:07:20	VD VD-R5-2 has been created.
INFO	2008/05/28 16:07:01	VD VD-R5-1 starts initialization.
INFO	2008/05/28 16:07:01	VD VD-R5-1 has been created.
INFO	2008/05/28 16:04:25	RG RG-R5 has been created.
INFO	2008/05/28 16:02:57	RG RG-R5 has been deleted.
INFO	2008/05/28 16:02:53	RG RG-R0 has been deleted.
INFO	2008/05/28 16:02:45	VD VD-02 has been deleted.
INFO	2008/05/28 16:02:41	VD SnapVD-02 has been deleted.
INFO	2008/05/28 16:02:41	VD SnapVD-01 has been deleted.
INFO	2008/05/28 16:02:41	VD VD-01 has been deleted.

Figure 3.8.5.1

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The event log is displayed in reverse order which means the latest event log is on the first page. The event logs are actually saved in the first four hard drives; each hard drive has one copy of event log. For one controller, there are four copies of event logs to make sure users can check event log any time when there is/are failed disk(s).

Tips
Please plug-in any of the first four hard drives, then event logs can be saved and displayed in next system boot up. Otherwise, the event logs would be disappeared.

3.8.6 Reboot and shutdown

"Reboot and shutdown" displays **"Reboot"** and **"Shutdown"** buttons. Before turning the power off, it's best to execute **"Shutdown"** to flush the data from cache to physical disks. This step is necessary for data protection.

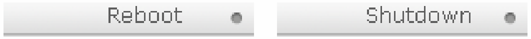

Figure 3.8.6.1

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3.9 Logout

For security reasons, **"Logout"** allows users to logout when no user is operating the system. To log back in to the system, enter username and password again.

Chapter 4 Advanced operation

4.1 Rebuild

If one of the physical disk on the VG which was set to a protected RAID level (e.g.: RAID 3, RAID 5, or RAID 6) has FAILED or has been unplugged/removed, then, the VG status is changed to degraded mode. The system will search/detect for a spare disk to **rebuild** the degraded VG. It will look for a dedicated spare disk first and if none is found, it will check if a global spare disk has been set up and use this disk for rebuild.

ISC8P2G-S supports Auto-Rebuild function. If the RAID level set on the VG is protected, such as RAID 3, RAID 5, RAID 6, and etc, ISC8P2G -S starts Auto-Rebuild as shown on the scenario below:

Take RAID 6 for example:

1. When there is no global spare disk or dedicated spare disk on the system , ISC8P2G-S will be in degraded mode and wait until (A) there is one disk assigned as spare disk, or (B) the failed disk is removed and replaced with new clean disk, then the Auto-Rebuild starts. The new disk will be a spare disk to the original VG automatically.

a. If the new added disk is not clean (with data on it), it would be marked as RS (reserved) and the system will not start "auto -rebuild".

b. If this disk does not belong to any existing VG, it would be FR (Free) disk and the system will start Auto-Rebuild function.

c. If user only removes the failed disk and plugs the same failed disk in the same slot again, the auto-rebuild will start. But rebuilding the array using the same failed disk may impact customer data later because of the unstable disk status. We suggest all customers not to rebuild the array using the same failed disk for better data protection.

2. When there is enough global spare disk (s) or dedicated spare disk (s) for the degraded array, ISC8P2G -S starts Auto-Rebuild immediately. And in RAID 6, if there is another disk failure happening during the time of rebuilding, ISC8P2G -S will start the above Auto-Rebuild scenario as well. And the Auto -Rebuild feature only works at "RUNTIME". It will not work during downtime. Thus, it will not conflict with the “Roaming” function.

In degraded mode, the status of VG is **“DG”**.

When rebuilding, the status of PD/VG/UDV is **"R"**; and **"R%"** in UDV will display the ratio in percentage. After complete rebuilding, **"R"** and **"DG"** will disappear.

> **Tips**
> The list box doesn't exist if there is no VG or only VG of RAID 0, JBOD. This is because user cannot set dedicated spare disk for these RAID levels.

Sometimes, rebuild is called recover. These two have the same meaning. The table below lists the relationship between RAID levels and rebuild.

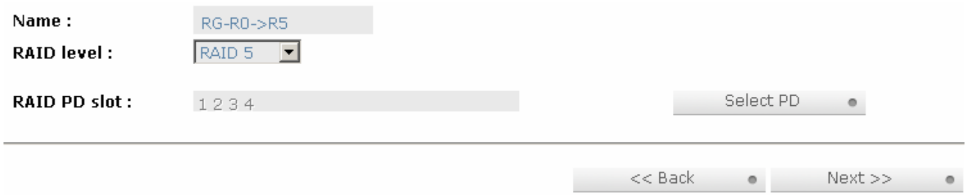
RAID 0	Disk striping. No protection of data. VG fails if any hard drive fails or gets unplug.
RAID 1	Disk mirroring over 2 disks. RAID 1 allows one hard drive failure or unplugging. Need one new hard drive to insert to the system for rebuild to be completed.
N-way mirror	Extension to RAID 1 level. It has N copies of the disk. N -way mirror allows N-1 hard drive failures or unplugging.
RAID 3	Striping with parity on the dedicated disk. RAID 3 allows one hard drive failure or unplugging.
RAID 5	Striping with interspersed parity over the member disks. RAID 5 allows one hard drive failure or unplugging.
RAID 6	2-dimensional parity protection over the member disks. RAID 6 allows two hard drive failure or unplugging. If it needs to rebuild two hard drives at the same time, it will rebuild the first one, then the other.
RAID 0+1	Mirroring of the members of the RAID 0 volumes. RAID 0+1 allows two hard drives to fail or gets unplugged, but they need to be part of the same array.
RAID 10	Striping over the members of the RAID 1 volumes. RAID 10 allows two hard drives to fail or gets unplugged, but they need to be part of different arrays.

RAID 30	Striping over the members of the RAID 3 volumes . RAID 30 allows two hard drives to fail or gets unplugged, but they need to be part of different arrays.
RAID 50	Striping over the member RAID 5 volumes . RAID 50 allows two hard drives to fail or gets unplugged, but they need to be part of different arrays.
RAID 60	Striping over the member RAID 6 volumes. RAID 40 allows four hard drives to fail or gets unplugged, but each two need to be part of different arrays.
JBOD	The abbreviation of **"J**ust a **B**unch **O**f **D**isks**"**. No protection of data. VG fails if any hard drive fails or gets unplug.

4.2 RG migration

To migrate the RAID level, follow the steps below.

1. Select **"/ Volume configuration / RAID group"** .
2. Move cursor to the gray button next to the RG number; click **"Migrate"**.
3. Change the RAID level by clicking the down arrow to **"RAID 5"**. There will be a pup-up which indicates that HDD is not enough to support the new setting of RAID level, click " Select PD " to increase hard drives, then click " Confirm " to go back to setup page. When doing migration to lower RAID level, such as the original RAID level is RAID 6 and user wants to migrate to RAID 0, system will evaluate whether this operation is safe or not, and appear a message of **"Sure to migrate to a lower protection array?"** to give user warning.



Name : RG-R0->R5

RAID level : RAID 5

RAID PD slot : 1 2 3 4

Figure 4.2.1

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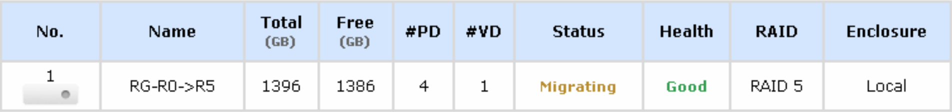
4. Double check the setting of RAID level and RAID PD slot. If there is no problem, click " Next >> ".

5. Finally a confirmation page shows the detail of RAID information. If there is no problem, click " Confirm " to start migration. System also pops up a message of **"Warning: power lost during migration may cause damage of data!"** to give user warning. When the power is abnormally off during the migration, the data is in high risk.
6. Migration starts and it can be seen from the **"status"** of a RG with **"Migrating"**. In **"/ Volume configuration / Virtual disk"**, it displays a **"Migrating"** in **"Status"** and complete percentage of migration in **"R%"**.



No.	Name	Total (GB)	Free (GB)	#PD	#VD	Status	Health	RAID	Enclosure
1	RG-R0->R5	1396	1386	4	1	Migrating	Good	RAID 5	Local

Figure 4.2.2

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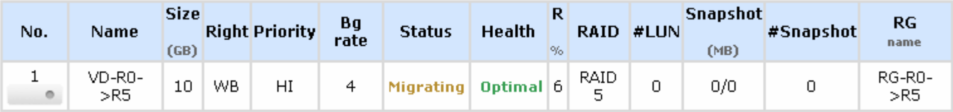
(Figure 4.2.2: A RAID 0 with 4 physical disks migrates to RAID 5 with 5 physical disks.)



No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot (MB)	#Snapshot	RG name
1	VD-R0->R5	10	WB	HI	4	Migrating	Optimal	6	RAID 5	0	0/0	0	RG-R0->R5

Figure 4.2.3

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(Figure 4.2.3: A RAID 0 migrates to RAID 5, the complete percentage is 14%.)

To do migration, the total size of RG must be larger or equal to the original RG. It does not allow expanding the same RAID level with the same hard disks of original RG.
The operation is not allowed when RG is being migrated. System would reject following operations:

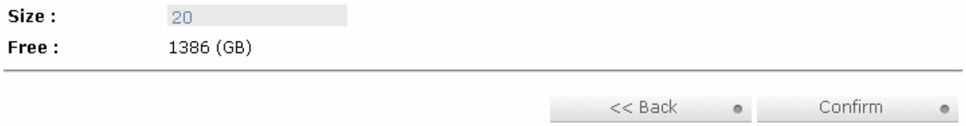
1. Add dedicated spare.
2. Remove a dedicated spare.
3. Create a new VD.
4. Delete a VD.
5. Extend a VD.
6. Scrub a VD.
7. Perform yet another migration operation.
8. Scrub entire RG.
9. Take a new snapshot.
10. Delete an existing snapshot.
11. Export a snapshot.
12. Rollback to a snapshot.

Caution
RG Migration cannot be executed during rebuild or VD extension.

4.3 VD Extension

To extend VD size, follow the steps below.

1. Select **"/ Volume configuration / Virtual disk"**.
2. Move cursor to the gray button next to the VD number; click **"Extend"**.
3. Change the size. The size must be larger than the original, and then click "Confirm" to start extension.



Size : 20

Free : 1386 (GB)

Figure 4.3.1

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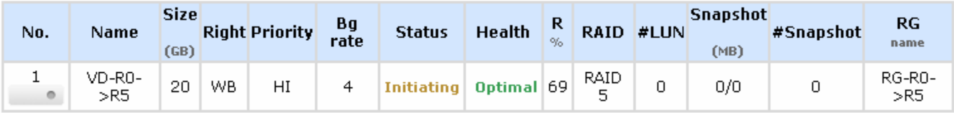
4. Extension starts. If VD needs initialization, it will display an **"Initiating"** in **"Status"** and complete percentage of initialization in **"R%"**.



No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot (MB)	#Snapshot	RG name
1	VD-R0->R5	20	WB	HI	4	Initiating	Optimal	69	RAID 5	0	0/0	0	RG-R0->R5

Figure 4.3.2

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(Figure 4.3.2: Extend VD-R5 from 20GB to 40GB.)

Tips

The size of VD extension must be larger than original.

Caution

VD Extension cannot be executed during rebuild or migration.

4.4 Snapshot (QSnap) / Rollback

Snapshot-on-the-box (QSnap) captures the instant state of data in the target volume in a logical sense. The underlying logic is Copy -on-Write -- moving out the data which would be written to certain location where a write action occurs since the time of data capture. The certain location, named as " Snap VD", is essentially a new VD which can be attached to a LUN provisioned to a host as a disk like other ordinary VDs in the system. Rollback restores the data back to its previous state at a time the snapshot was captured. Snap VD is allocated within the same RG in which the snapshot is taken, we suggest to reserve 20% of RG size or more for snapshot space. Refer to Figure 4.4.1 for snapshot concept.

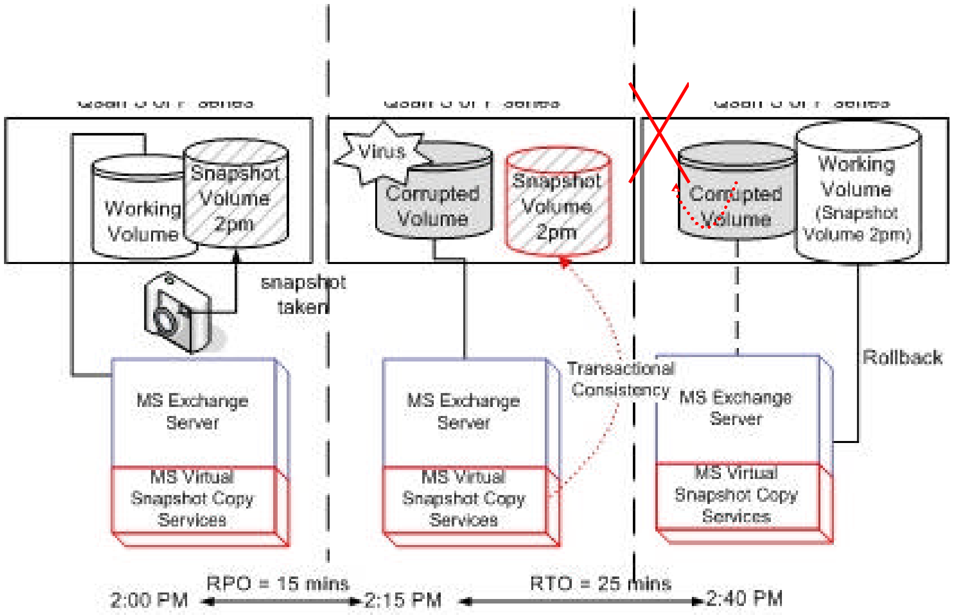
Working Volume
Snapshot Volume 2pm
snapshot taken
MS Exchange Server
MS Virtual Snapshot Copy Services
Virus
Corrupted Volume
Snapshot Volume 2pm
MS Exchange Server
MS Virtual Snapshot Copy Services
Transactional Consistency
Corrupted Volume
Working Volume (Snapshot Volume 2pm)
Rollback
MS Exchange Server
MS Virtual Snapshot Copy Services
2:00 PM
RPO = 15 mins
2:15 PM
RTO = 25 mins
2:40 PM

Figure 4.4.1

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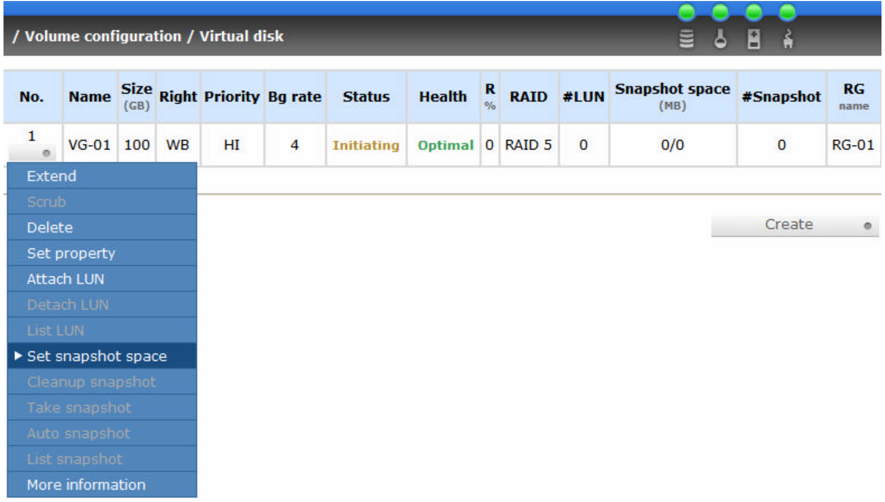
Caution
Snapshot / rollback features need **512MB** RAM at least. Please also refer to RAM certification l ist in Appendix A.

4.4.1 Create snapshot volume

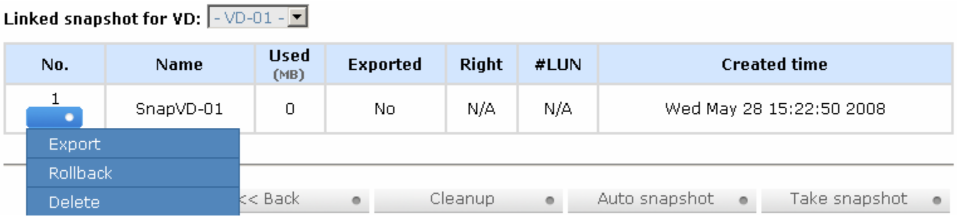
To take a snapshot of the data, follow the steps below.

1. Select **“/ Volume configuration / Virtual disk”**.


/ Volume configuration / Virtual disk
Extend
Scrub
Delete
Set property
Attach LUN
Detach LUN
List LUN
Set snapshot space
Cleanup snapshot
Take snapshot
Auto snapshot
List snapshot
More information
Create

No.	Name	Size (GB)	Right	Priority	Bg rate	Status	Health	R %	RAID	#LUN	Snapshot space (MB)	#Snapshot	RG name
1	VG-01	100	WB	HI	4	Initiating	Optimal	0	RAID 5	0	0/0	0	RG-01

2. Move cursor to the gray button next to the VD number; click **“Set snapshot space”**.
3. Set up the size for snapshot. The minimum size is suggested to be **20%** of VD size, then click “Confirm“. It will go back to the VD page and the size will show in the snapshot column. It may not be the same as the number entered because some size is reserved for snapshot’s internal usage. There will be 2 numbers in **“Snapshot (MB)”** column. These numbers mean **“Used snapshot space”** and **“Total snapshot space”**.
4. There are two methods to take snapshot. In **“/ Volume configuration / Virtual disk”**, move cursor to the gray button next to the VD number; click **“Take snapshot”**. Or in **“/ Volume configuration / Snapshot”**, click “Take snapshot”.
5. Enter a snapshot name, then click “Confirm”. A snapshot VD is created.
6. Select **“/ Volume configuration / Snapshot”** to display all snapshot VDs related to the VD.


Export
Rollback
Delete
<< Back
Cleanup
Auto snapshot
Take snapshot

Linked snapshot for VD: - VD-01 -

No.	Name	Used (MB)	Exported	Right	#LUN	Created time
1	SnapVD-01	0	No	N/A	N/A	Wed May 28 15:22:50 2008

Figure 4.4.1.1

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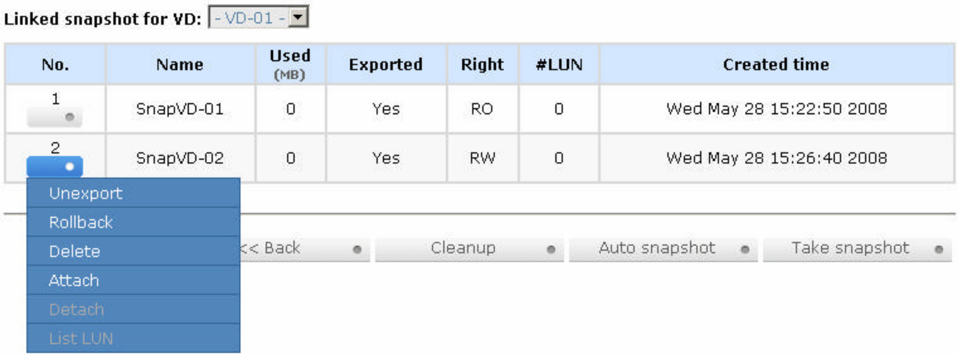
(Figure 4.4.1.1: This is Snap VD, but it is not exported.)

7. Move cursor to the gray button next to the Snapshot VD number; click **“Export”**. Enter a capacity for snapshot VD. If size is zero, the exported snapshot VD will be read only. Otherwise, the exported snapshot VD can be read/written, and the size will be the maximum capacity to read/write.
8. Attach a LUN for snap shot VD. Please refer to the previous chapter for attaching a LUN.
9. Done. It can be used as a disk.


Unexport
Rollback
Delete
Attach
Detach
List LUN
<< Back
Cleanup
Auto snapshot
Take snapshot

Linked snapshot for VD: - VD-01 -

No.	Name	Used (MB)	Exported	Right	#LUN	Created time
1	SnapVD-01	0	Yes	RO	0	Wed May 28 15:22:50 2008
2	SnapVD-02	0	Yes	RW	0	Wed May 28 15:26:40 2008

Figure 4.4.1.2

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(Figure 4.4.1.2: This is the list of “VD-01”. There are two snapshots in “VD-01”. Snapshot VD “SnapVD-01” is exported to read only, “SnapVD-02” is exported to read/write.)

10. There are two methods to clean all snapshots. In **“/ Volume configuration / Virtual disk”**, move cursor to the gray button next to the VD number; click **“Cleanup snapshot”**. Or in **“/ Volume configuration / Snapshot”**, click “Cleanup ●”.
11. Cleanup will delete all snapshots related to the VD and release snapshot space.

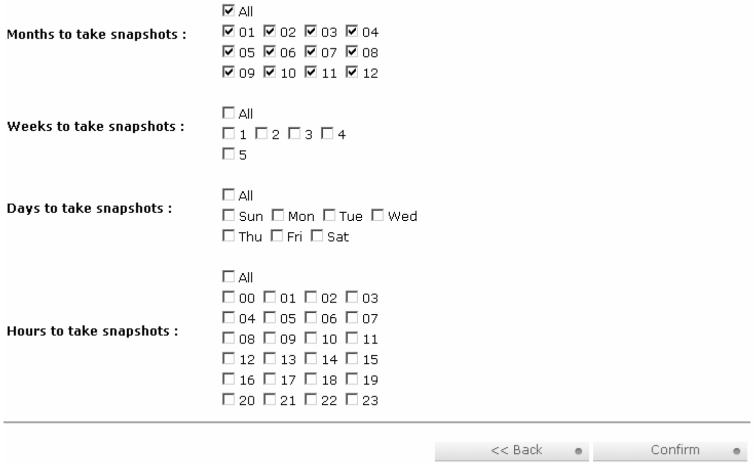
Snapshot has some constraints:

1. Minimum RAM size of enabling snapshot is **512MB**.
2. For performance and future rollback, system saves snapshot with names in sequences. For example, three snapshots has been taken and named "SnapVD-01"(first), "SnapVD-02" and "SnapVD-03"(last). When deleting "SnapVD-02", both of "SnapVD-02" and "SnapVD-03" will be deleted because "SnapVD-03" is related to "SnapVD-02".
3. For resource management, maximum number of snapshots is **32**.
4. If the snapshot space is full, system will send a warning message that the space is full and the new taken snapshot will replace the oldest snapshot in rotational sequence by executing auto snapshot, but new snapshot can not be taken manually because system does not know which snapshot VDs can be deleted.

4.4.2 Auto snapshot

The snapshot copies can be taken manually or be schedule either hourly or daily. Follow the steps below.

1. There are two methods to set auto snapshot. In **"/ Volume configuration / Virtual disk"**, move cursor to the gray button next to the VD number; click **"Auto snapshot"**. Or in **"/ Volume configuration / Snapshot"**, click "Auto snapshot ●".
2. The auto snapshot can be set monthly, weekly, daily, or hourly.
3. Done. It will take snapshots automatically.



Months to take snapshots :
☑ All
☑ 01 ☑ 02 ☑ 03 ☑ 04
☑ 05 ☑ 06 ☑ 07 ☑ 08
☑ 09 ☑ 10 ☑ 11 ☑ 12

Weeks to take snapshots :
☐ All
☐ 1 ☐ 2 ☐ 3 ☐ 4
☐ 5

Days to take snapshots :
☐ All
☐ Sun ☐ Mon ☐ Tue ☐ Wed
☐ Thu ☐ Fri ☐ Sat

Hours to take snapshots :
☐ All
☐ 00 ☐ 01 ☐ 02 ☐ 03
☐ 04 ☐ 05 ☐ 06 ☐ 07
☐ 08 ☐ 09 ☐ 10 ☐ 11
☐ 12 ☐ 13 ☐ 14 ☐ 15
☐ 16 ☐ 17 ☐ 18 ☐ 19
☐ 20 ☐ 21 ☐ 22 ☐ 23

Figure 4.4.2.1

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(Figure 4.4.2.1: It will take snapshots every month, and keep the last 32 snapshot copies.)

Tips
Daily snapshot will be taken every 00:00. Weekly snapshot will be taken every Sunday 00:00. Monthly snapshot will be taken every first day of month 00:00.

4.4.3 Rollback

The data in snapshot VD can be roll back to original VD. Follow the steps below.

1. Select **"/ Volume configuration / Snapshot"**.
2. Move cursor to the gray button next to the Snap VD number which user wants to rollback the data ; click **"Rollback"**.
3. Done, the data in snapshot VD will rollback to original VD.

Rollback has some constraints as described"

1. Minimum RAM size of enabling rollback is **512MB**.
2. When making a rollback, the original VD cannot be accessed for a while. At the same time, the system connects to original VD and the snapshot VD, and then starts rollback.
3. During rollback, data from snapshot VD to original VD can be accessed. At the same time, the other related snapshot VD(s) can not be accessed.
4. After rollback, the other snapshot VD(s) after the VD rollback is completed will be deleted.

Caution
Before executing rollback, it is best to dismount iSCSI drive for data to be flashed from cache to disks. The system sends a pop-up message when user executes rollback function .

4.5 Disk roaming

Physical disks can be re-sequenced in the same system or all physical disks be moved from ISC8P2G-S system-1 to system-2. This is called disk roaming. System can execute disk roaming online. Follow the steps below.

1. Select **"/ Volume configuration / RAID group"**.
2. Move cursor to the gray button next to the RG number; click **"Deactivate"**.
3. Move all PDs related to the RG to another system.
4. Move cursor to the gray button next to the RG number; click **"Activate"**.
5. Done.

Disk roaming has some constraints as described:

1. Check the firmware of two systems first. It is best that both ISC8P2G-S systems have the same firmware version or newer.
2. All physical disks of related RG should be moved from system-1 to system-2 together. The configuration of both RG and VD will be kept but LUN configuration will be cleared in order to avoid conflict with system-2.

4.6 Support Microsoft MPIO and MC/S

MPIO (Multi-Path Input/Output) and **MC/S** (Multiple Connections per Session) use multiple physical paths to create logical "paths" between the server and the storage device. In the case where one or more of these components fails, causing the path to fail, multi-path logic uses an alternate path for I/O so applications can still access their data.

Microsoft iSCSI initiator supports multi-path. Please follow the procedures to use MPIO feature.

1. A host with dual LAN ports connects cables to controller.
2. Create a RG/VD and attach this VD to the host.
3. When installing **"Microsoft iSCSI initiator"**, please install MPIO driver at the same time.
4. Logon to target separately on each port. When logon to target, check **"Enable multi-path"**.
5. MPIO mode can be selected on Targets à Details à Devices à Advanced in Microsoft iSCSI initiator.
6. Rescan disk.
7. There will be one disk running MPIO.

Appendix

A. Certification list

- **RAM**

ISC8P2G-S RAM Spec: 184pins, DDR333(PC2700), Reg.(register) or UB(Unbufferred), ECC or Non-ECC, from 64MB to 1GB, 32-bit or 64-bit data bus width, x8 or x16 devices, 9 to 11 bits column address.

- **iSCSI Initiator (Software)**

OS	Software/Release Number
Microsoft Windows	Microsoft iSCSI Software Initiator Release v2.05 System Requirements: 1. Windows XP Professional with SP2 2. Windows 2000 Server with SP4 3. Windows Server 2003 with SP1 4. Windows Server 2003 R2
Linux	The iSCSI Initiators are different for different Linux Kernels. 1. For Red Hat Enterprise Linux 3 (Kernel 2.4), install linux-iscsi-3.6.3.tar 2. For Red Hat Enterprise Linux 4 (Kernel 2.6), use the build-in iSCSI initiator iscsi-initiator-utils-4.0.3.0-4 in kernel 2.6.9 3. For Red Hat Enterprise Linux 5 (Kernel 2.6), use the build-in iSCSI initiator iscsi-initiator-utils-6.2.0.695-0.7.e15 in kernel 2.6.18
Mac	ATTO XTEND 2.0x SAN / Mac iSCSI Initiator GlobalSAN iSCSI Initiator v3.0 System Requirements: 1. Mac® OS X v10.3.5 or later

For ATTO initiator, it is not free. Please contact your local distributor for ATTO initiator.

- **iSCSI HBA card**

Vendor	Model
Adaptec	ASC-7211C (PCI-X, Gigabit, 1 port, TCP/IP offload, iSCSI offload)
HP	NC380T (PCI-Express, Gigabit, 2 ports, TCP/IP offload, iSCSI offload)
QLogic	QLA4010C (PCI-X, Gigabit, 1 port, TCP/IP offload, iSCSI offload)
QLogic	QLA4052C (PCI-X, Gigabit, 2 ports, TCP/IP offload, iSCSI offload)

For detailed setup steps of Qlogic QLA4010C, please refer to Appendix G: QLogic QLA4010C setup instructions.

- **NIC**

Vendor	Model
D-Link	DGE-530T (PCI, Gigabit, 1 port)
HP	NC7170 (PCI-X, Gigabit, 2 ports)
HP	NC360T (PCI-Express, Gigabit, 2 ports, TCP/IP offload)
IBM	NetXtreme 1000 T (73P4201) (PCI-X, Gigabit, 2 ports, TCP/IP offload)
Intel	PWLA8490MT (PCI-X, Gigabit, 1 port, TCP/IP offload)
Intel	PWLA8492MT (PCI-X, Gigabit, 2 ports, TCP/IP offload)
Intel	PWLA8494MT (PCI-X, Gigabit, 4 ports, TCP/IP offload)

- **GbE Switch**

Vendor	Model
Dell	PowerConnect 5324
Dell	PowerConnect 2724
Dell	PowerConnect 2708
HP	ProCurve 1800-24G
D-Link	DGS-3024

- **Hard drive**

ISC8P2G-S support SATA I, II disks.

Vendor	Model
Hitachi	Deskstar 7K250, HDS722580VLSA80, 80GB, 7200RPM, SATA, 8M
Hitachi	Deskstar 7K80, HDS728080PLA380, 80GB, 7200RPM, SATA II, 8M
Hitachi	Deskstar E7K500, HDS725050KLA360, 500G, 7200RPM, SATA II, 16M
Hitachi	Deskstar 7K80, HDS728040PLA320, 40G, 7200RPM, SATA II, 2M
Hitachi	Deskstar T7K500, HDT725032VLA360, 320G, 7200RPM, SATA II, 16M
Maxtor	DiamondMax Plus 9, 6Y080M0, 80G, 7200RPM, SATA, 8M
Maxtor	DiamondMax 11, 6H500F0, 500G, 7200RPM, SATA 3.0Gb/s, 16M
Samsung	SpinPoint P80, HDSASP0812C, 80GB •7200RPM, SATA, 8M
Seagate	Barracuda 7200.7, ST380013AS, 80G, 7200RPM, SATA 1.5Gb/s, 8M
Seagate	Barracuda 7200.7, ST380817AS, 80G, 7200RPM, SATA 1.5Gb/s, 8M, NCQ
Seagate	Barracuda 7200.8, ST3400832AS, 400G, 7200RPM, SATA 1.5Gb/s, 8M, NCQ
Seagate	Barracuda 7200.9, ST3500641AS, 500G, 7200RPM, SATA 3.0Gb/s, 16M, NCQ
Seagate	NL35, ST3400633NS, 400G, 7200RPM, SATA 3.0Gb/s, 16M
Seagate	NL35, ST3500641NS, 500G, 7200RPM, SATA 3.0Gb/s, 16M
Seagate	Barracuda ES, ST3500630NS, 500G, 7200RPM, SATA 3.0Gb/s, 16M
Seagate	Barracuda ES, ST3750640NS, 750G, 7200RPM, SATA 3.0Gb/s, 16M
Seagate	Barracuda ES.2, ST31000340NS, 1000G, 7200RPM, SATA 3.0Gb/s, 32M
Westem Digital	Caviar SE, WD800JD, 80GB, 7200RPM, SATA 3.0Gb/s, 8M
Westem Digital	Caviar SE, WD1600JD, 160GB, 7200RPM, SATA 1.5G/s , 8M
Westem Digital	Raptor, WD360GD, 36.7GB, 10000RPM, SATA 1.5Gb/s, 8M
Westem Digital	Caviar RE2, WD4000YR, 400GB, 7200RPM, SATA 1.5Gb/s, 16M, NCQ
Westem Digital	RE2, WD4000YS, 400GB, 7200RPM, SATA 3.0Gb/s, 16M
Westem Digital	Caviar RE16, WD5000AAKS, 500GB, 7200RPM, SATA 3.0Gb/s, 16M
Westem Digital	RE2, WD5000ABYS, 500GB, 7200RPM, SATA 3.0Gb/s, 16M, NCQ

B. Event notifications

- **PD/S.M.A.R.T. events**

Level	Type	Description
Info	Disk inserted	Info: Disk <slot> is inserted.
Info	Disk removed	Info: Disk <slot> is removed.
Warning	S.M.A.R.T. threshold exceed condition	Warning: Disk <slot> S.M.A.R.T. threshold exceed condition occurred for attribute of 1. read error rate 2. spin up time 3. reallocated sector count 4. seek error rate 5. spin up retries 6. calibration retries
Warning	S.M.A.R.T. information	Warning: Disk <slot>: Failure to get S.M.A.R.T information

- **Physical HW events**

Level	Type	Description
Warning	ECC error	Warning: Single-bit ECC error is detected.
Error	ECC error	Error: Multi-bit ECC error is detected.
Info	ECC DIMM Installed	Info: ECC Memory is installed.
Info	Non-ECC installed	Info: Non-ECC Memory is installed.
Error	Host chip failure	Error: Host channel chip failed.
Error	Drive chip failure	Error: Drive channel chip failed.
Warning	Ethernet port failure	Warning: GUI Ethernet port failed.

- **HDD IO events**

Level	Type	Description
Warning	Disk error	Error: Disk <slot> read block error.
Warning	Disk error	Error: Disk <slot> writes block error.
Warning	HDD failure	Error: Disk <slot> is failed.
Warning	Channel error	Error: Disk <slot> IO incomplete.

- **SES events**

Level	Type	Description
Info	SES load conf. OK	Info: SES configuration has been loaded.
Warning	SES Load Conf. Failure	Error: Failed to load SES configuration. The SES device is disabled.
Info	SES is disabled	Info: The SES device is disabled.
Info	SES is enabled	Info: The SES device is enabled

- **Environmental events**

Level	Type	Description
Info	Admin Login OK	Info: Admin login from <IP or serial console> via <Web UI or Console UI>.
Info	Admin Logout OK	Info: Admin logout from <IP or serial console> via <Web UI or Console UI>.
Info	iSCSI data port login	Info: iSCSI login from <IQN> (<IP:Port Number>) succeeds.
Warning	iSCSI data port login reject	Warning: iSCSI login from <IQN> (<IP:Port Number>) was rejected, reason of 1. initiator error 2. authentication failure 3. authorization failure 4. target not found 5. unsupported version 6. too many connections 7. missing parameter 8. session does not exist 9. target error 10. out of resources 11. unknown
Error	Thermal critical	Error: System Overheated!!! The system will do the auto shutdown immediately.
Warning	Thermal warning	Warning: System temperature is a little bit higher.
Error	Voltage critical	Error: System voltages failed!!! The system will do the auto shutdown immediately
Warning	Voltage warning	Warning: System voltage is a little bit higher/lower.
Info	PSU restore	Info: Power <number> is restored to work.
Error	PSU Fail	Error: Power <number> is out of work.
Info	Fan restore	Info: Fan <number> is restore to work.
Error	Fan Fail	Error: Fan <number> is out of work.
Error	Fan non-exist	Error: System cooling fan is not installed.
Error	AC Loss	Error: AC loss for the system is detected.
Info	UPS Detection OK	Info: UPS detection succeed
Warning	UPS Detection Fail	Warning: UPS detection failed
Error	AC Loss	Error: AC loss for the system is detected

Error	UPS power low	Error: UPS Power Low!!! The system will do the auto shutdown immediately.
Info	Mgmt Lan Port Active	Info: Management LAN Port is active.
Warning	Mgmt Lan Port Failed	Warning: Fail to manage the system via the LAN Port.
Info	RTC Device OK	Info: RTC device is active.
Warning	RTC Access Failed	Warning: Fail to access RTC device
Info	Reset Password	Info: Reset Admin Password to default.
Info	Reset IP	Info: Reset network settings set to default.

- **System config events**

Level	Type	Description
Info	Sys Config. Defaults Restored	Info: Default system configurations restored.
Info	Sys NVRAM OK	Info: The system NVRAM is active.
Error	Sys NVRAM IO Failed	Error: Can't access the system NVRAM.
Warning	Sys NVRAM is full	Warning: The system NVRAM is full.

- **System maintenance events**

Level	Type	Description
Info	Firmware Upgraded	Info: System firmware has been upgraded
Error	Firmware Upgraded Failed	Error: System firmware upgrade failed.
Info	System reboot	Info: System has been rebooted
Info	System shutdown	Info: System has been shutdown.
Info	System Init OK	Info: System has been initialized OK.
Error	System Init Failed	Error: System cannot be initialized in the last boot up.

- **LVM events**

Level	Type	Description
Info	VG Created OK	Info: VG <name> has been created.
Warning	VG Created Fail	Warning: Fail to create VG <name>.
Info	VG Deleted	Info: VG <name> has been deleted.
Info	UDV Created OK	Info: UDV <name> has been created.
Warning	UDV Created Fail	Warning: Fail to create UDV <name>.
Info	UDV Deleted	Info: UDV <name> has been deleted.
Info	UDV Attached OK	Info: UDV <name> has been LUN-attached.
Warning	UDV Attached Fail	Warning: Fail to attach LUN to UDV <name>.
Info	UDV Detached OK	Info: UDV <name> has been detached.

Warning	UDV Detached Fail	Warning: Fail to detach LUN from Bus <number> SCSI_ID <number> LUN <number>.
Info	UDV_OP Rebuild Started	Info: UDV <name> starts rebuilding.
Info	UDV_OP Rebuild Finished	Info: UDV <name> completes rebuilding.
Warning	UDV_OP Rebuild Fail	Warning: Fail to complete UDV <name> rebuilding.
Info	UDV_OP Migrate Started	Info: UDV <name> starts migration.
Info	UDV_OP Migrate Finished	Info: UDV <name> completes migration.
Warning	UDV_OP Migrate Failed	Warning: Fail to complete UDV <name> migration.
Warning	VG Degraded	Warning: VG <name> is under degraded mode.
Warning	UDV Degraded	Warning: UDV <name> is under degraded mode.
Info	UDV Init OK	Info: UDV <name> completes the initialization.
Warning	UDV_OP Stop Initialization	Warning: Fail to complete UDV <name> initialization.
Warning	UDV IO Fault	Error: IO failure for stripe number <number> in UDV <name>.
Warning	VG Failed	Error: Fail to access VG <name>.
Warning	UDV Failed	Error: Fail to access UDV <name>.
Warning	Global CV Adjustment Failed	Error: Fail to adjust the size of the global cache.
Info	Global Cache	Info: The global cache is OK.
Error	Global CV Creation Failed	Error: Fail to create the global cache.
Info	UDV Rename	Info: UDV <name> has been renamed as <name>.
Info	VG Rename	Info: VG <name> has been renamed as <name>.
Info	Set VG Dedicated Spare Disks	Info: Assign Disk <slot> to be VG <name> dedicated spare disk.
Info	Set Global Disks	Info: Assign Disk <slot> to the Global Spare Disks.
Info	UDV Read-Only	Info: UDV <name> is a read-only volume.
Info	WRBK Cache Policy	Info: Use the write-back cache policy for UDV <name>.
Info	WRTHRU Cache Policy	Info: Use the write-through cache policy for UDV <name>.
Info	High priority UDV	Info: UDV <name> is set to high priority.
Info	Mid Priority UDV	Info: UDV <name> is set to mid priority.
Info	Low Priority UDV	Info: UDV <name> is set to low priority.
Error	PD configuration read/write error	Error: PD <slot> lba <#> length <#> config <read | write> failed.
Error	PD read/write error	Error: PD <#> lba <#> length <#> <read | write> error.
Error	UDV recoverable read/write error	Error: UDV <name> stripe <#> PD <#> lba <#> length <#> <read | write> recoverable
Error	UDV unrecoverable read/write error	Error: UDV <#> stripe <#> PD <#> lba <#> length <#> <read | write> unrecoverable

Info	UDV stripe rewrite start/fail/succeed	Info: UDV <name> stripe <#> rewrite column bitmap <BITMAP> <started | failed | finished>.

C. Known issues

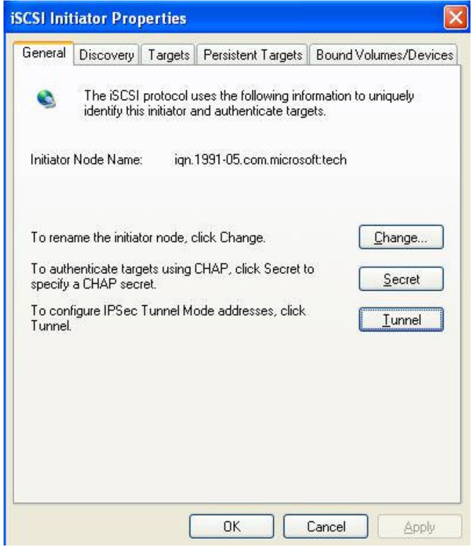
1. Microsoft MPIO is not supported on Windows XP or Windows 2000 Professional.

   Workaround solution: Using Windows Server 2008, 2003 or Windows 2000 server to run MPIO.

D. Microsoft iSCSI Initiator

Here is the step-by-step procedure to setup Microsoft iSCSI Initiator. Visit Microsoft website for latest iSCSI initiator.

1. Run Microsoft iSCSI Initiator version 2.08. See Figure D.1.
2. Click **"Discovery"**.


iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Change...
Secret
Tunnel
OK
Cancel
Apply

The iSCSI protocol uses the following information to uniquely identify this initiator and authenticate targets.

Initiator Node Name: iqn.1991-05.com.microsoft:tech

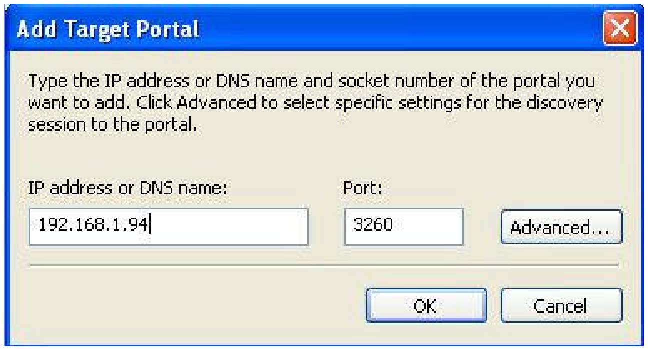
To rename the initiator node, click Change.

To authenticate targets using CHAP, click Secret to specify a CHAP secret.

To configure IPSec Tunnel Mode addresses, click Tunnel.

Figure D.1

3. Click **“Add”**. Input IP address or DNS name of ISC8P2G. Please see Figure D.2.


Add Target Portal
Advanced...
OK
Cancel

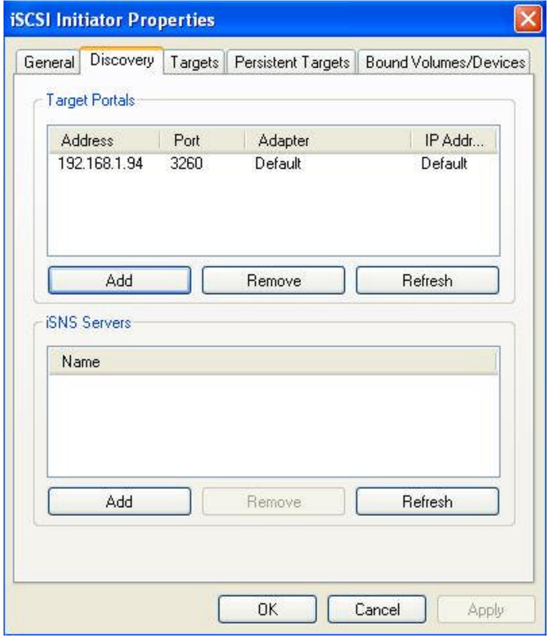
Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.

IP address or DNS name: 192.168.1.94

Port: 3260

Figure D.2

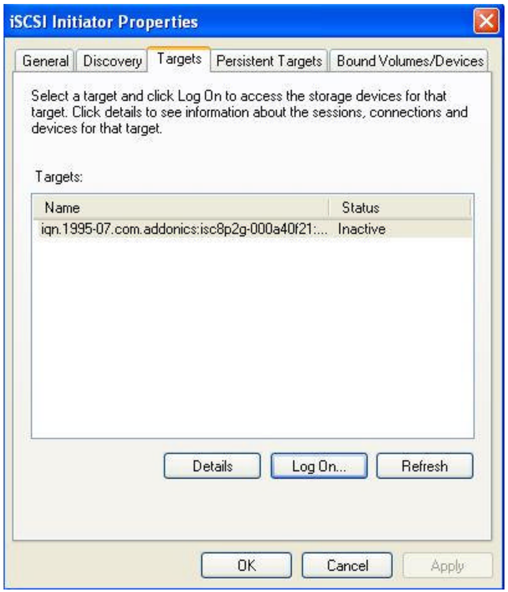
4. Click **“OK”**. Please see Figure D.3.


iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Target Portals
Add
Remove
Refresh
iSNS Servers
Name
Add
Remove
Refresh
OK
Cancel
Apply

Address	Port	Adapter	IP Addr...
192.168.1.94	3260	Default	Default

Figure D.3

5. Click **“Targets”**. Please see Figure D.4.



iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices

Select a target and click Log On to access the storage devices for that target. Click details to see information about the sessions, connections and devices for that target.

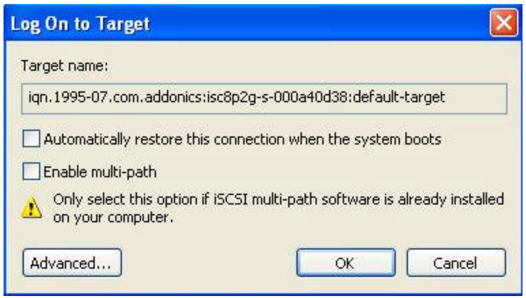
Targets:

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f21:...	Inactive

Details
Log On...
Refresh
OK
Cancel
Apply

Figure D.4

6. Click **“Log On”**. Please see Figure D.5. Check **“Enable multi-path”** if running MPIO.



Log On to Target

Target name:

iqn.1995-07.com.addonics:isc8p2g-s-000a40d38:default-target

☐ Automatically restore this connection when the system boots

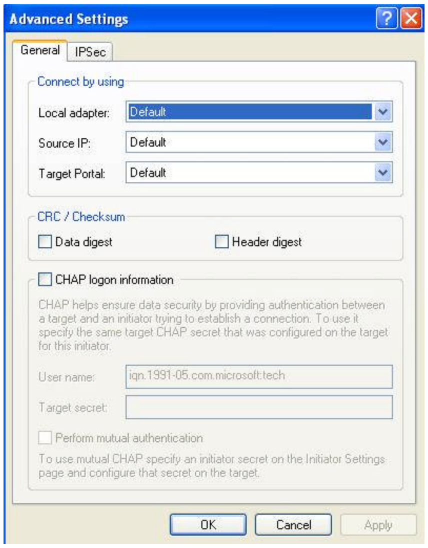
☐ Enable multi-path

Only select this option if iSCSI multi-path software is already installed on your computer.

Advanced...
OK
Cancel

Figure D.5

7. Click **"Advance…"** if CHAP information is needed. Please see Figure D.6.


Advanced Settings
General
IPSec
Connect by using
CRC / Checksum
OK
Cancel
Apply

Local adapter: Default

Source IP: Default

Target Portal: Default

☐ Data digest ☐ Header digest

☐ CHAP logon information

CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.

User name: iqn.1991-05.com.microsoft:tech

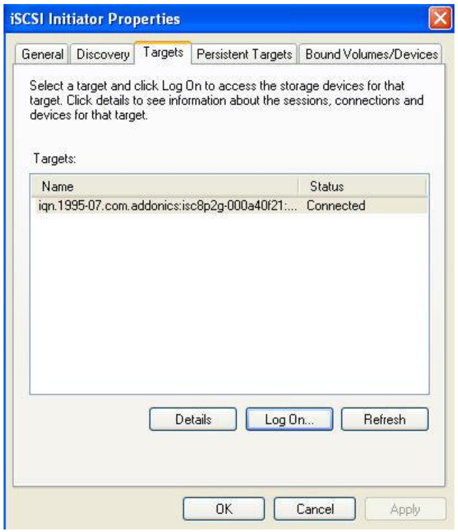
Target secret:

☐ Perform mutual authentication

To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.

Figure D.6

8. Click **"OK"**. The status would be "Connected". Please see Figure D.7.


iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Details
Log On...
Refresh
OK
Cancel
Apply

Select a target and click Log On to access the storage devices for that target. Click details to see information about the sessions, connections and devices for that target.

Targets:

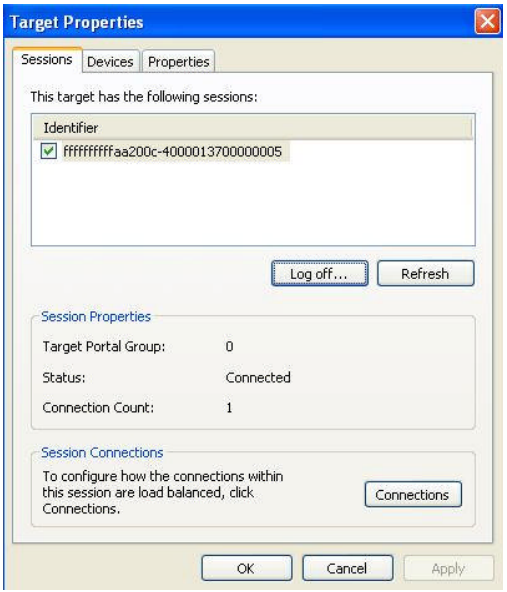
Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f21:...	Connected

Figure D.7

9. Done. You can connect to the iSCSI disk.

The following steps shows how to log off iSCSI drive.

1. Click **"Details"**. Please see Figure D.8.


Target Properties
Sessions
Devices
Properties
Log off...
Refresh
Connections
OK
Cancel
Apply

This target has the following sessions:

Identifier
☑ ffffffffaa200c-4000013700000005

Session Properties

Target Portal Group: 0
Status: Connected
Connection Count: 1

Session Connections

To configure how the connections within this session are load balanced, click Connections.

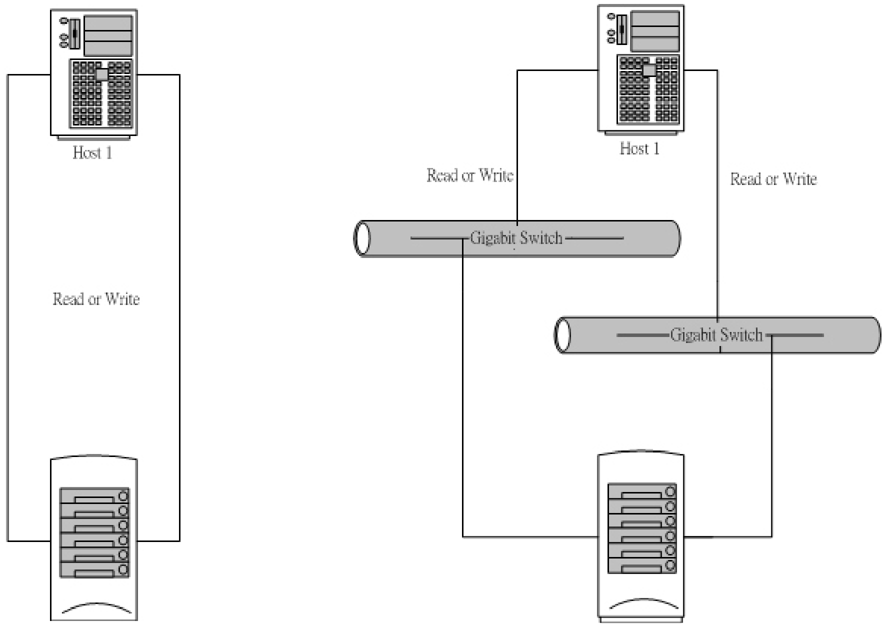
Figure D.8

2. Check the Identifier, which will be deleted.
3. Click **"Log off"**.
4. Done. The iSCSI drive was log off successfully.

E. MPIO and MC/S setup instructions

Here is the step-by-step procedure to setup MPIO. There are 2 kinds of scenarios for MPIO. Please see Figure F.1. We suggest using scenario 2 for better performance.

- Network diagram of MPIO.


Host 1
Read or Write
Host 1
Read or Write
Read or Write
Gigabit Switch
Gigabit Switch

1. Dual ports with MPIO (Direct connect, host has 2 LAN ports, read or write in one UDV)

2. Dual ports with MPIO (Via switches, host has 2 LAN ports, read or write in one UDV)

Figure F.1

Below are the setup instructions.

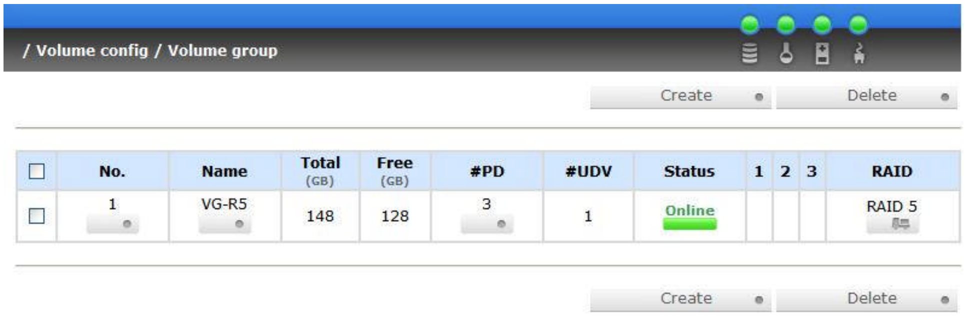
Microsoft MPIO is NOT supported on Windows XP or Windows 2000 Professional.

Workaround solution: Using Windows Server 2003, 2008 or Windows 2000 server to run MPIO. You have to enable MPIO or install MPIO driver on the server before doing this instruction.

On a Windows Server 2008, to install MPIO

1. In the Server Manager console tree, click Features node.
2. In the Features pane, under Features Summary, click Add Features.
3. In the Add Features wizard, select Multipath I/O check box, and click Next.
4. Follow the steps on the Add Features wizard.

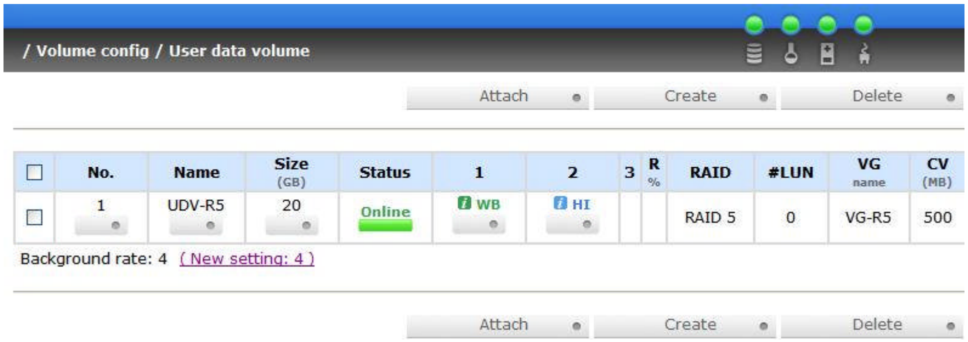
1. Create a VG with RAID 5, using 3 HDDs.


/ Volume config / Volume group
Create
Delete
Create
Delete

☐	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	RAID
☐	1	VG-R5	148	128	3	1	Online				RAID 5

Figure F.2

2. Create a UDV by using RAID 5 VG.

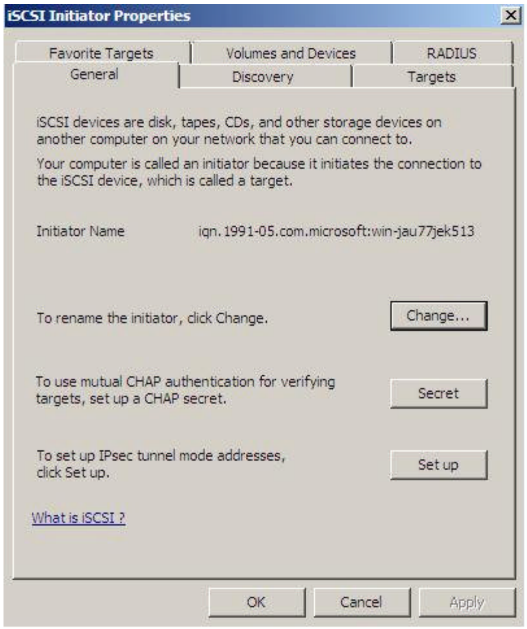

/ Volume config / User data volume
Attach
Create
Delete
Attach
Create
Delete

☐	No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	VG name	CV (MB)
☐	1	UDV-R5	20	Online	WB	HI			RAID 5	0	VG-R5	500

Background rate: 4 (New setting: 4)

Figure F.3

3. Run Microsoft iSCSI initiator and check the Initiator Node Name.


iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Change...
Secret
Set up
What is iSCSI ?
OK
Cancel
Apply

iSCSI devices are disk, tapes, CDs, and other storage devices on another computer on your network that you can connect to.

Your computer is called an initiator because it initiates the connection to the iSCSI device, which is called a target.

Initiator Name iqn.1991-05.com.microsoft:win-jau77jek513

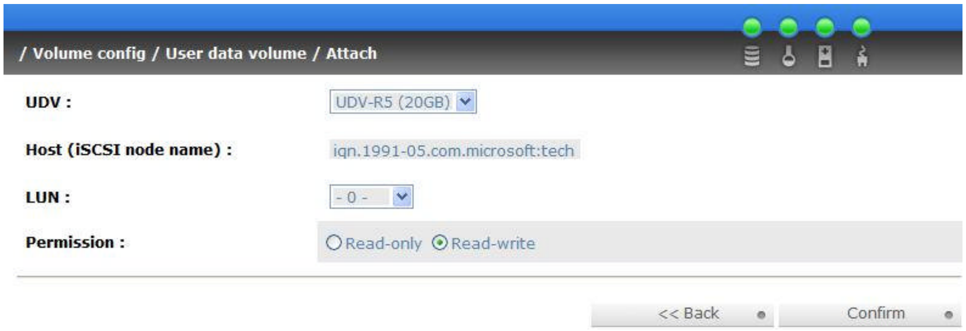
To rename the initiator, click Change.

To use mutual CHAP authentication for verifying targets, set up a CHAP secret.

To set up IPsec tunnel mode addresses, click Set up.

Figure F.4

4. Attached LUN to R5 UDV. Input the Initiator Node Name in Host field.


/ Volume config / User data volume / Attach
<< Back
Confirm

UDV : UDV-R5 (20GB)

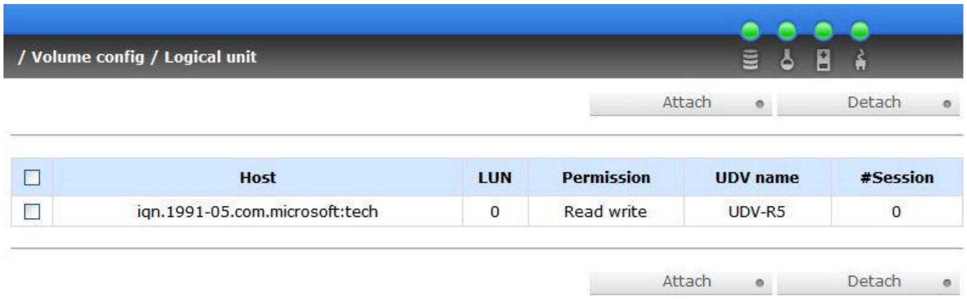
Host (iSCSI node name) : iqn.1991-05.com.microsoft:tech

LUN : - 0 -

Permission : ○ Read-only ● Read-write

Figure F.5

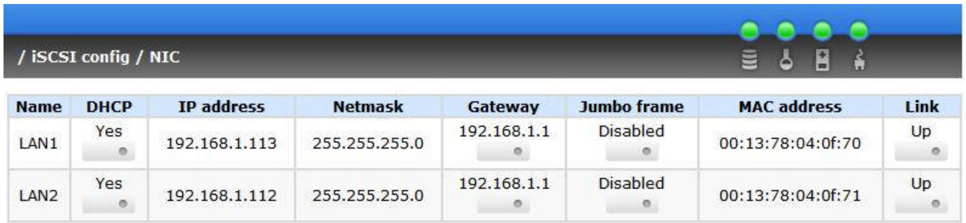
5. The volume config setting is done .


/ Volume config / Logical unit
Attach
Detach
Attach
Detach

☐	Host	LUN	Permission	UDV name	#Session
☐	iqn.1991-05.com.microsoft:tech	0	Read write	UDV-R5	0

Figure F.6

6. Check iSCSI settings. The IP address of iSCSI data port 1 is 192.168.1.113, port 2 is 192.168.1.112 for example.


/ iSCSI config / NIC

Name	DHCP	IP address	Netmask	Gateway	Jumbo frame	MAC address	Link
LAN1	Yes	192.168.1.113	255.255.255.0	192.168.1.1	Disabled	00:13:78:04:0f:70	Up
LAN2	Yes	192.168.1.112	255.255.255.0	192.168.1.1	Disabled	00:13:78:04:0f:71	Up

Figure F.7

7. Add Target Portals on Microsoft iSCSI initiator.

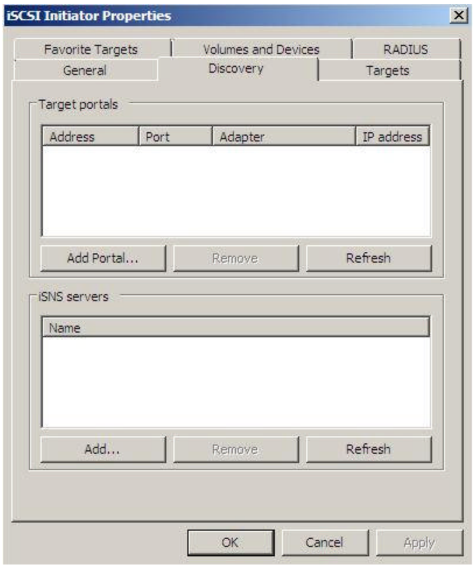
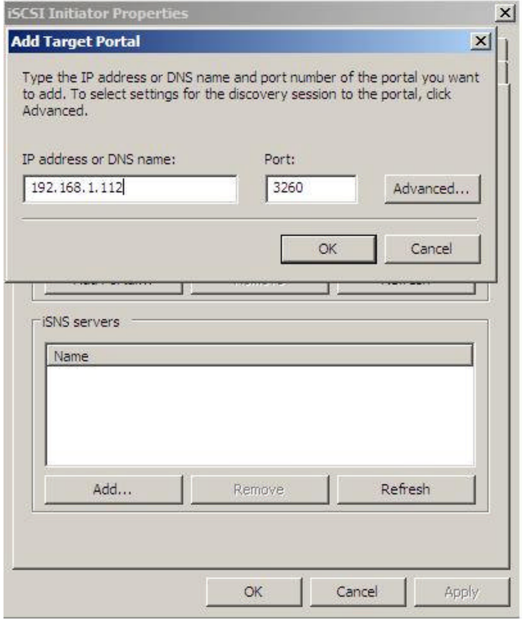

iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Target portals
Address
Port
Adapter
IP address
Add Portal...
Remove
Refresh
iSNS servers
Name
Add...
Remove
Refresh
OK
Cancel
Apply

Figure F.8

8. Input the IP address of iSCSI data port 1 (192.168.1.112 as mentioned in previous page).


iSCSI Initiator Properties
Add Target Portal
Advanced...
OK
Cancel
iSNS servers
Name
Add...
Remove
Refresh
OK
Cancel
Apply

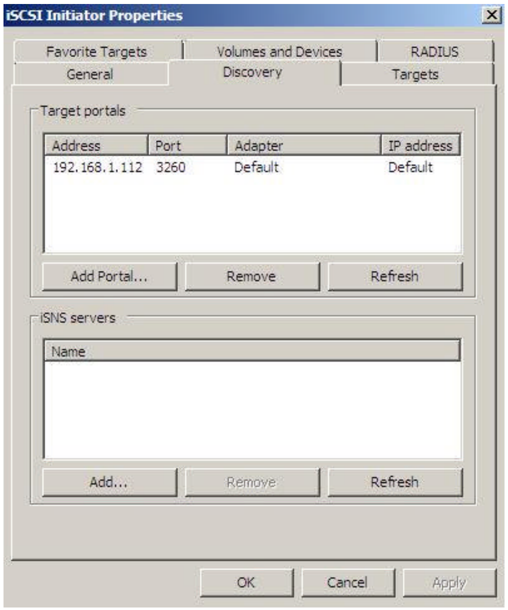
Type the IP address or DNS name and port number of the portal you want to add. To select settings for the discovery session to the portal, click Advanced.

IP address or DNS name: 192.168.1.112

Port: 3260

Figure F.9

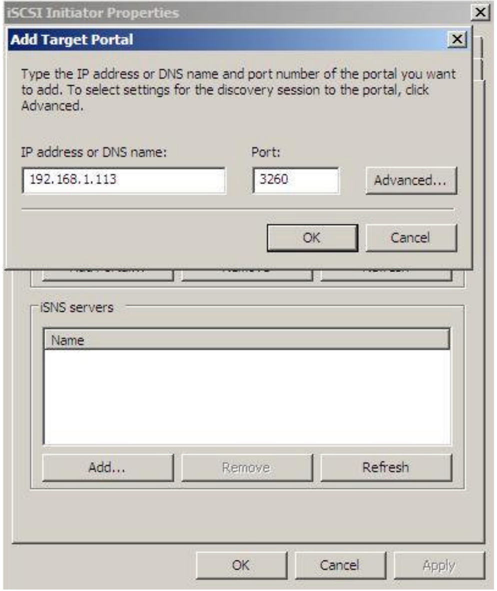
9. Add second Target Portals on Microsoft iSCSI initiator.


iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Target portals
Add Portal...
Remove
Refresh
iSNS servers
Name
Add...
Remove
Refresh
OK
Cancel
Apply

Address	Port	Adapter	IP address
192.168.1.112	3260	Default	Default

Figure F.10

10. Input the IP address of iSCSI data port 2 (192.168.1.113 as mentioned in previous page).


iSCSI Initiator Properties
Add Target Portal
Advanced...
OK
Cancel
iSNS servers
Name
Add...
Remove
Refresh
OK
Cancel
Apply

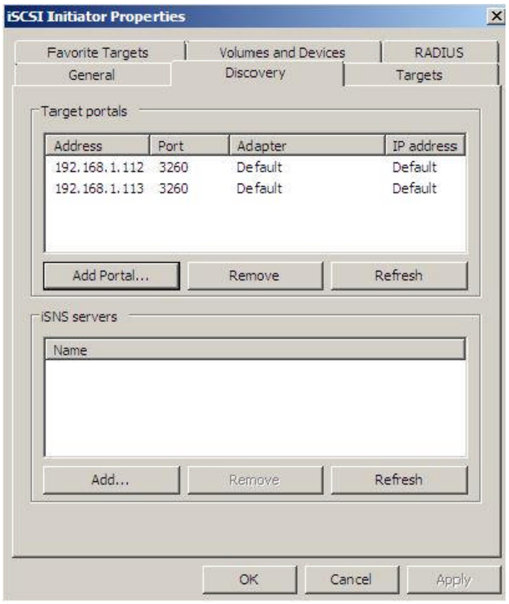
Type the IP address or DNS name and port number of the portal you want to add. To select settings for the discovery session to the portal, click Advanced.

IP address or DNS name: 192.168.1.113

Port: 3260

Figure F.11

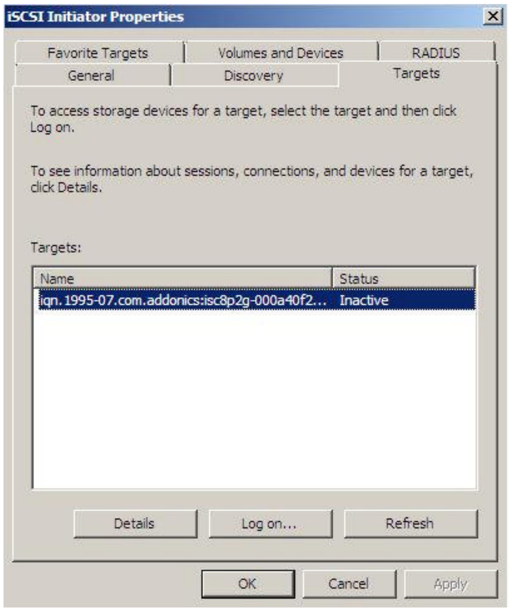
11. The initiator setting is done.


iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Target portals
Add Portal...
Remove
Refresh
iSNS servers
Name
Add...
Remove
Refresh
OK
Cancel
Apply

Address	Port	Adapter	IP address
192.168.1.112	3260	Default	Default
192.168.1.113	3260	Default	Default

Figure F.12

12. Log on.


iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Details
Log on...
Refresh
OK
Cancel
Apply

To access storage devices for a target, select the target and then click Log on.

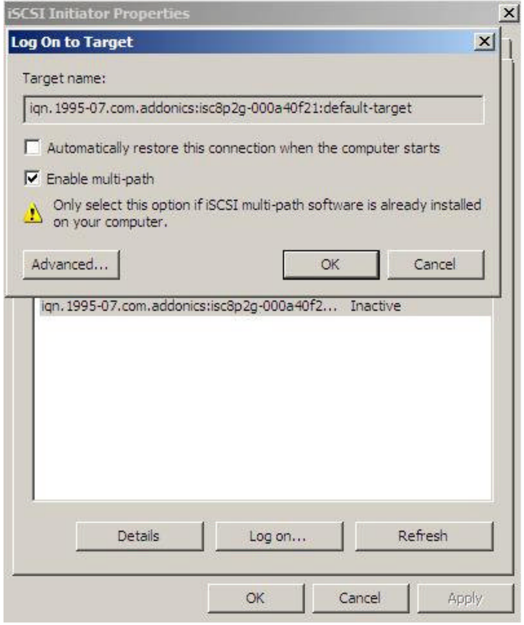
To see information about sessions, connections, and devices for a target, click Details.

Targets:

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f2...	Inactive

Figure F.13

13. Enable **“Enable multi-path”** checkbox. Then click **“Advanced”**.


iSCSI Initiator Properties
Log On to Target
Advanced...
OK
Cancel
Details
Log on...
Refresh
OK
Cancel
Apply

Target name:

iqn.1995-07.com.addonics:isc8p2g-000a40f21:default-target

☐ Automatically restore this connection when the computer starts

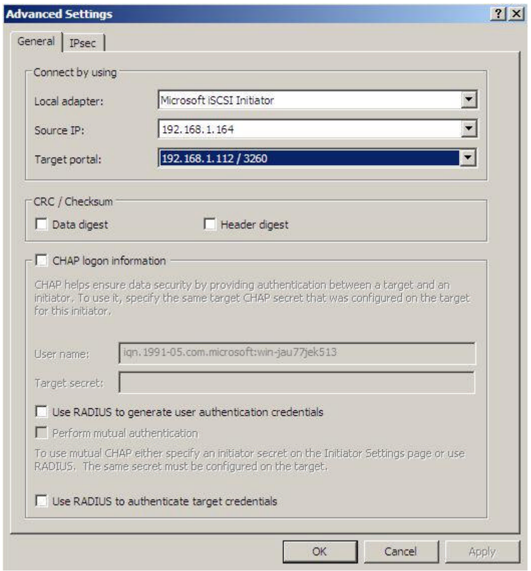
☑ Enable multi-path

Only select this option if iSCSI multi-path software is already installed on your computer.

iqn.1995-07.com.addonics:isc8p2g-000a40f2... Inactive

Figure F.14

14. Select Target Portal to iSCSI data port 1 (192.168.1.112). Then click **"OK"**


Advanced Settings
General
IPsec
OK
Cancel
Apply

Connect by using

Local adapter: Microsoft iSCSI Initiator

Source IP: 192.168.1.164

Target portal: 192.168.1.112 / 3260

CRC / Checksum

☐ Data digest ☐ Header digest

☐ CHAP logon information

CHAP helps ensure data security by providing authentication between a target and an initiator. To use it, specify the same target CHAP secret that was configured on the target for this initiator.

User name: iqn.1991-05.com.microsoft:win-jau77jek513

Target secret:

☐ Use RADIUS to generate user authentication credentials

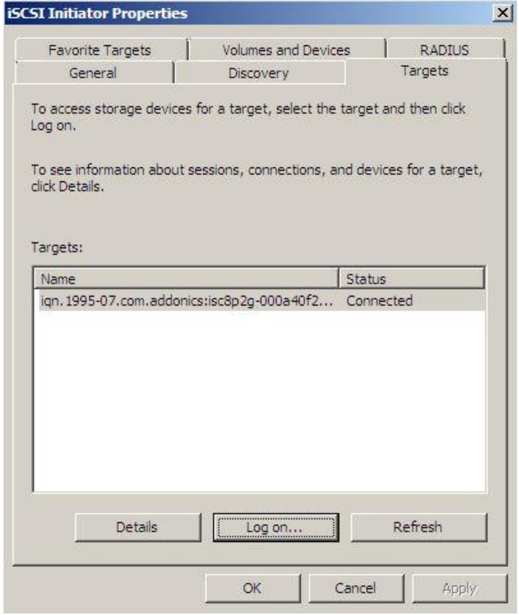
☐ Perform mutual authentication

To use mutual CHAP either specify an initiator secret on the Initiator Settings page or use RADIUS. The same secret must be configured on the target.

☐ Use RADIUS to authenticate target credentials

Figure F.15

15. Log on **"Enable multi-path"** again.


iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Details
Log on...
Refresh
OK
Cancel
Apply

To access storage devices for a target, select the target and then click Log on.

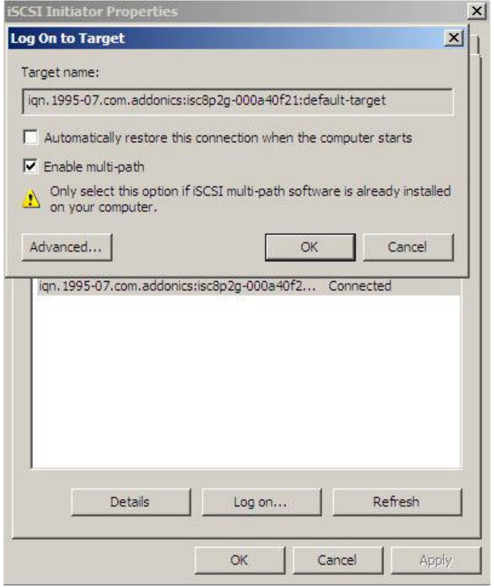
To see information about sessions, connections, and devices for a target, click Details.

Targets:

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f2...	Connected

Figure F.16

16. Enable **“Enable multi-path”** checkbox. Then click **“Advanced…”**.


iSCSI Initiator Properties
Log On to Target
Advanced...
OK
Cancel
Details
Log on...
Refresh
OK
Cancel
Apply

Target name:
iqn.1995-07.com.addonics:isc8p2g-000a40f21:default-target

☐ Automatically restore this connection when the computer starts

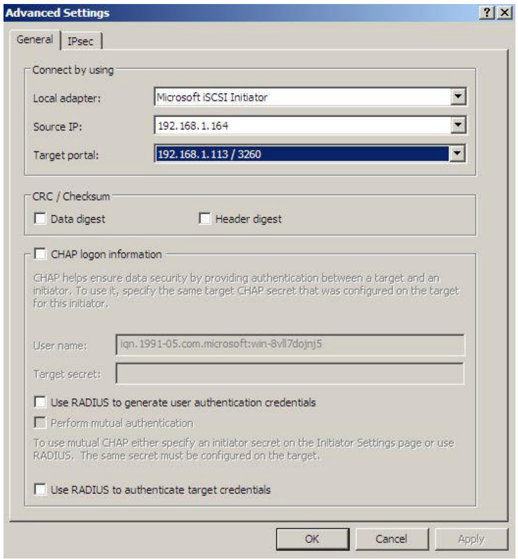
☑ Enable multi-path

Only select this option if iSCSI multi-path software is already installed on your computer.

iqn.1995-07.com.addonics:isc8p2g-000a40f2... Connected

Figure F.17

17. Select Target Portal to iSCSI data port 2 (192.168.1.113). Then select **“OK”**


Advanced Settings
General
IPsec
OK
Cancel
Apply

Connect by using

Local adapter: Microsoft iSCSI Initiator

Source IP: 192.168.1.164

Target portal: 192.168.1.113 / 3260

CRC / Checksum

☐ Data digest ☐ Header digest

☐ CHAP logon information

CHAP helps ensure data security by providing authentication between a target and an initiator. To use it, specify the same target CHAP secret that was configured on the target for this initiator.

User name: iqn.1991-05.com.microsoft:win-8vll7dojnj5

Target secret:

☐ Use RADIUS to generate user authentication credentials

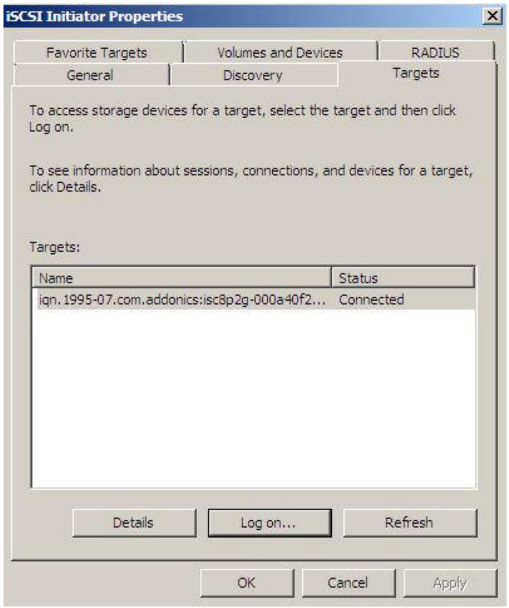
☐ Perform mutual authentication

To use mutual CHAP either specify an initiator secret on the Initiator Settings page or use RADIUS. The same secret must be configured on the target.

☐ Use RADIUS to authenticate target credentials

Figure F.18

18. The iSCSI drive is connected.


iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Details
Log on...
Refresh
OK
Cancel
Apply

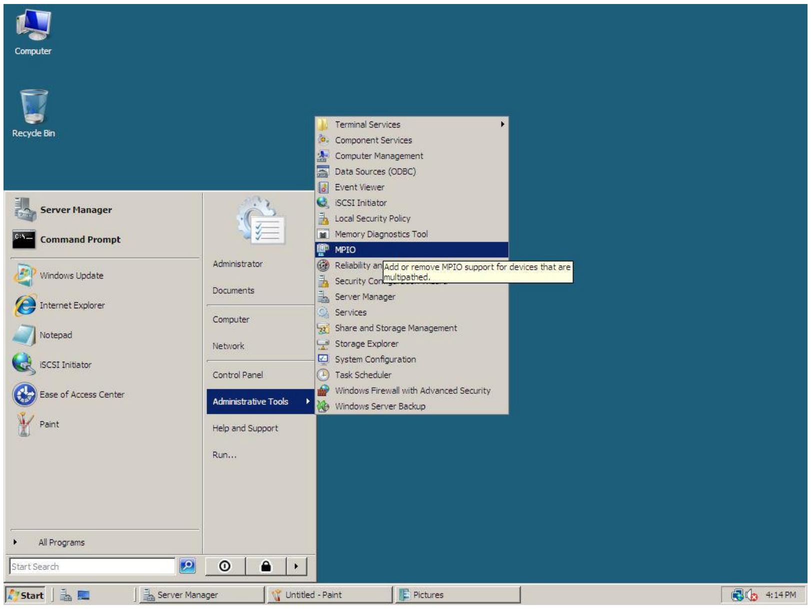
To access storage devices for a target, select the target and then click Log on.

To see information about sessions, connections, and devices for a target, click Details.

Targets:

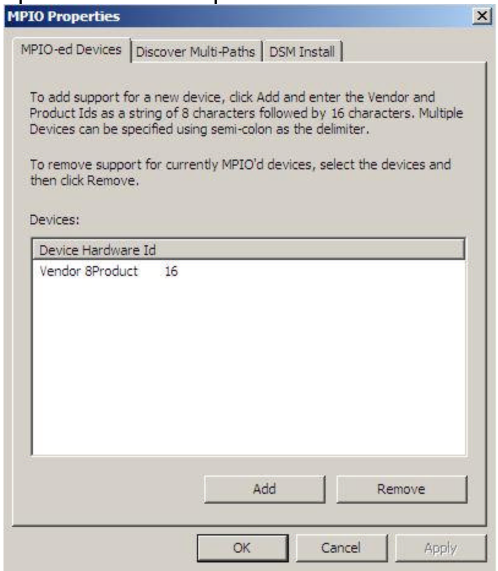
Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f2...	Connected

19. After the MPIO feature has been enabled, configure MPIO through the tool in Administrative Tools.


Computer
Recycle Bin
Server Manager
Command Prompt
Windows Update
Internet Explorer
Notepad
iSCSI Initiator
Ease of Access Center
Paint
All Programs
Start Search
Administrator
Documents
Computer
Network
Control Panel
Administrative Tools
Help and Support
Run...
Terminal Services
Component Services
Computer Management
Data Sources (ODBC)
Event Viewer
iSCSI Initiator
Local Security Policy
Memory Diagnostics Tool
MPIO
Reliability an
Security Co
Server Manager
Services
Share and Storage Management
Storage Explorer
System Configuration
Task Scheduler
Windows Firewall with Advanced Security
Windows Server Backup
Start
Server Manager
Untitled - Paint
Pictures
4:14 PM

Add or remove MPIO support for devices that are multipathed.

20. The MPIO Properties window opens.


MPIO Properties
MPIO-ed Devices
Discover Multi-Paths
DSM Install
Add
Remove
OK
Cancel
Apply

To add support for a new device, click Add and enter the Vendor and Product Ids as a string of 8 characters followed by 16 characters. Multiple Devices can be specified using semi-colon as the delimiter.

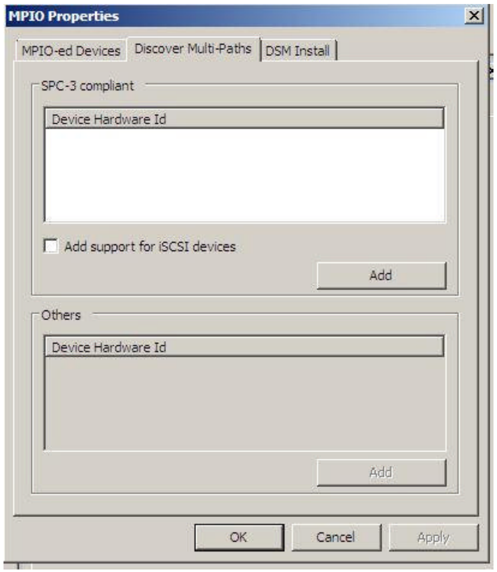
To remove support for currently MPIO'd devices, select the devices and then click Remove.

Devices:

Device Hardware Id
Vendor 8Product 16

Figure F.19

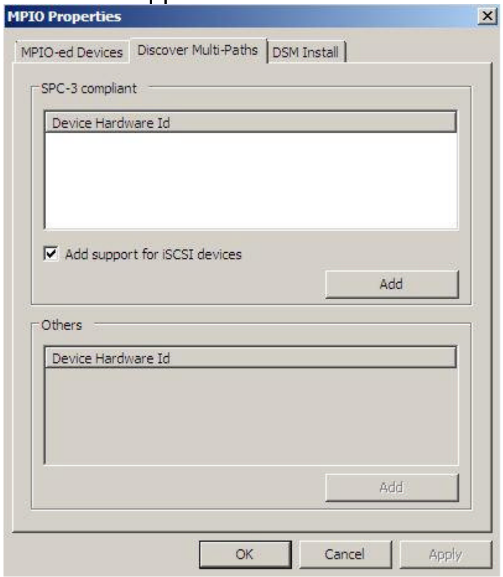
21. Click on the Discover Multi -Paths tab.


MPIO Properties
MPIO-ed Devices
Discover Multi-Paths
DSM Install
SPC-3 compliant
Device Hardware Id
Add
Others
Device Hardware Id
Add
OK
Cancel
Apply

☐ Add support for iSCSI devices

Figure F.20

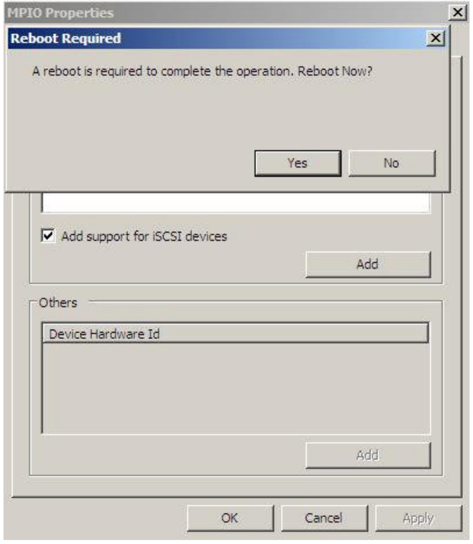
22. Check the option of Add support for iSCSI device and click on Add button.


MPIO Properties
MPIO-ed Devices
Discover Multi-Paths
DSM Install
SPC-3 compliant
Device Hardware Id
Add
Others
Device Hardware Id
Add
OK
Cancel
Apply

☑ Add support for iSCSI devices

Figure F.21

23. The system will ask you to reboot to make the change take effect.


MPIO Properties
Reboot Required
Yes
No
Add
Others
Device Hardware Id
Add
OK
Cancel
Apply

A reboot is required to complete the operation. Reboot Now?

☑ Add support for iSCSI devices

Figure F.22

24. After reboot, log on the iSCSI target again. Under Disk Driver in Device Manager, notice that the Addonics iSCSI is now a Multi -Path Disk Device.

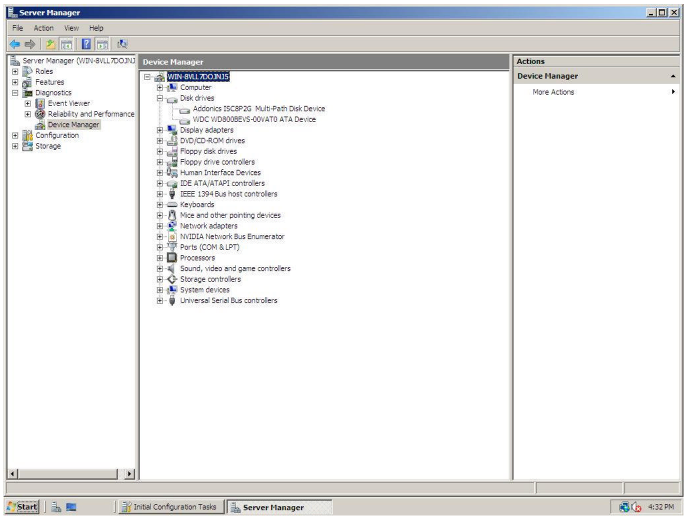
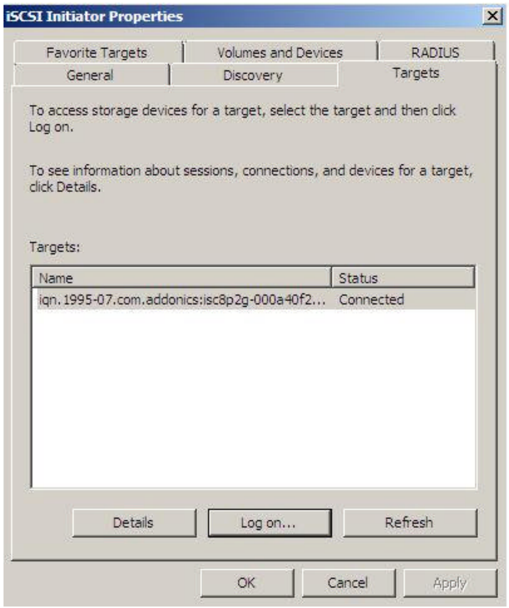

Server Manager
File Action View Help
Server Manager (WIN-8VLL7DOJNJ
Roles
Features
Diagnostics
Event Viewer
Reliability and Performance
Device Manager
Configuration
Storage
Device Manager
WIN-8VLL7DOJNJ5
Computer
Disk drives
Addonics ISC8P2G Multi-Path Disk Device
WDC WD800BEVS-00VAT0 ATA Device
Display adapters
DVD/CD-ROM drives
Floppy disk drives
Floppy drive controllers
Human Interface Devices
IDE ATA/ATAPI controllers
IEEE 1394 Bus host controllers
Keyboards
Mice and other pointing devices
Network adapters
NVIDIA Network Bus Enumerator
Ports (COM & LPT)
Processors
Sound, video and game controllers
Storage controllers
System devices
Universal Serial Bus controllers
Actions
Device Manager
More Actions
Start
Initial Configuration Tasks
Server Manager
4:32 PM

Figure F.23

25. Connect to the iSCSI device.


iSCSI Initiator Properties
Favorite Targets
Volumes and Devices
RADIUS
General
Discovery
Targets
Details
Log on...
Refresh
OK
Cancel
Apply

To access storage devices for a target, select the target and then click Log on.

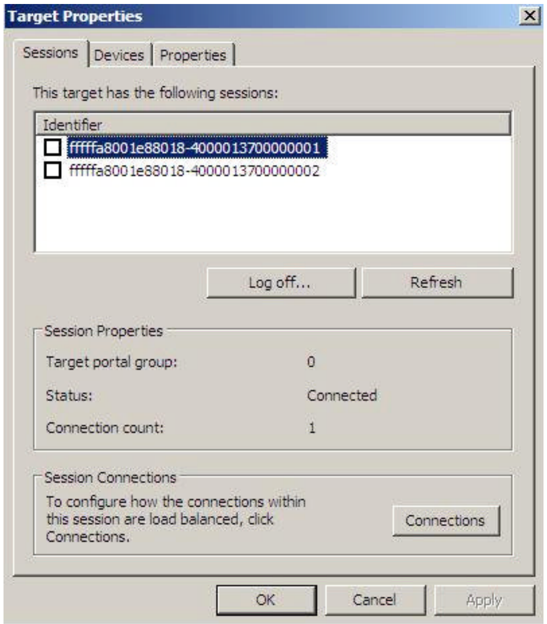
To see information about sessions, connections, and devices for a target, click Details.

Targets:

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f2...	Connected

Figure F.24

26. Click **“Details”**.


Target Properties
Sessions
Devices
Properties
Log off...
Refresh
Connections
OK
Cancel
Apply

This target has the following sessions:

Identifier

☐ fffffa8001e88018-4000013700000001

☐ fffffa8001e88018-4000013700000002

Session Properties

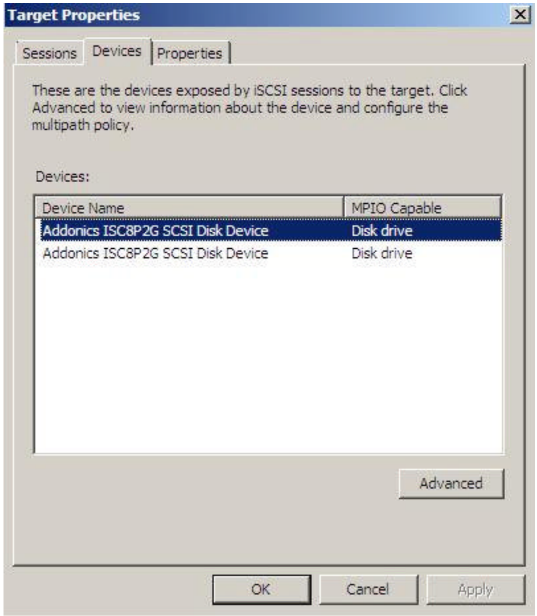
Target portal group:	0
Status:	Connected
Connection count:	1

Session Connections

To configure how the connections within this session are load balanced, click Connections.

Figure F.25

27. Click **“Device”** tab, then click **“Advanced”**.


Target Properties
Sessions
Devices
Properties
Advanced
OK
Cancel
Apply

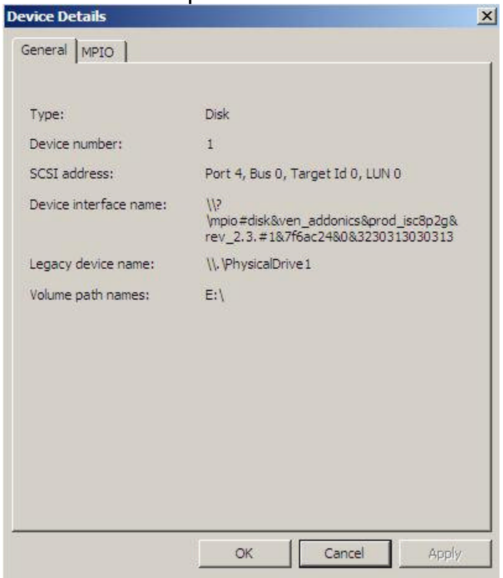
These are the devices exposed by iSCSI sessions to the target. Click Advanced to view information about the device and configure the multipath policy.

Devices:

Device Name	MPIO Capable
Addonics ISC8P2G SCSI Disk Device	Disk drive
Addonics ISC8P2G SCSI Disk Device	Disk drive

Figure F.26

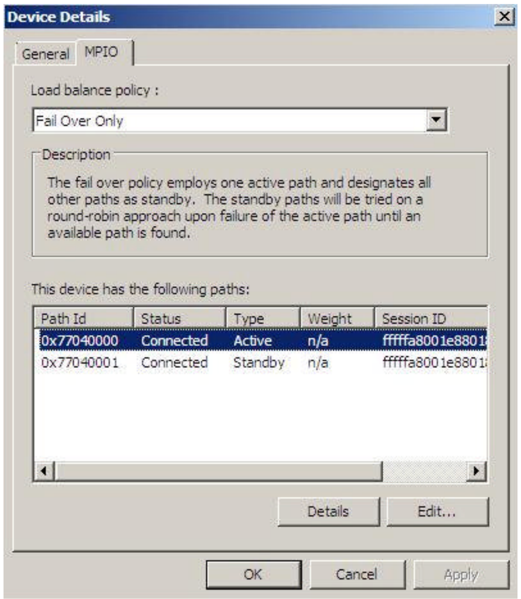
28. The Device Details window opens


Device Details
General
MPIO
OK
Cancel
Apply

Type:	Disk
Device number:	1
SCSI address:	Port 4, Bus 0, Target Id 0, LUN 0
Device interface name:	\\? \mpio#disk&ven_addonics&prod_isc8p2g& rev_2.3.#1&7f6ac24&0&3230313030313
Legacy device name:	\\.\PhysicalDrive1
Volume path names:	E:\

Figure F.26

29. Click **"MPIO"** tab, select **"Fail Over Only"** to **"Round Robin"**.


Device Details
General
MPIO
Details
Edit...
OK
Cancel
Apply

Load balance policy : Fail Over Only

Description

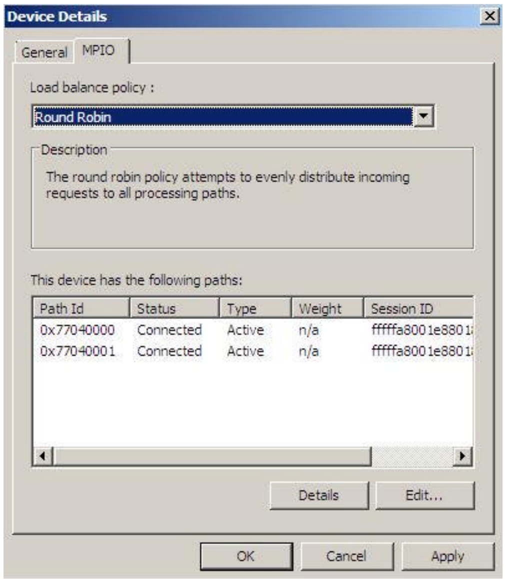
The fail over policy employs one active path and designates all other paths as standby. The standby paths will be tried on a round-robin approach upon failure of the active path until an available path is found.

This device has the following paths:

Path Id	Status	Type	Weight	Session ID
0x77040000	Connected	Active	n/a	fffffa8001e8801
0x77040001	Connected	Standby	n/a	fffffa8001e8801

Figure F.27

30. Click **“Apply”**. Both connections Type now becomes Active.


Device Details
General
MPIO

Load balance policy : Round Robin

Description

The round robin policy attempts to evenly distribute incoming requests to all processing paths.

This device has the following paths:

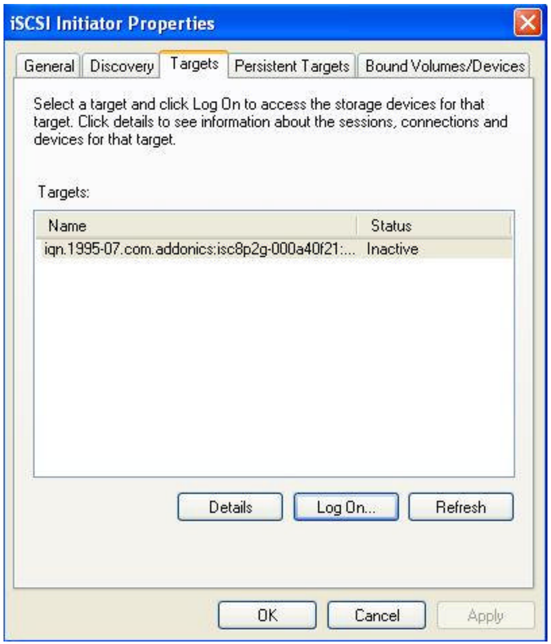
Path Id	Status	Type	Weight	Session ID
0x77040000	Connected	Active	n/a	fffffa8001e8801
0x77040001	Connected	Active	n/a	fffffa8001e8801

Details
Edit...
OK
Cancel
Apply

Figure F.28

The **MC/S** setup instructions is very similar to MPIO. Detailed steps are presented below. For the target side setting, the steps are exactly the same as MPIO. Please refer to **Figure F.1 to Figure F.8**.

1. Create a VG with RAID 5, using 3 HDDs.
2. Create a UDV by using RAID 5 VG.
3. Run Microsoft iSCSI initiator 2.08 and check the Initiator Node Name.
4. Attach LUN to R5 UDV. Input the Initiator Node Name in Host field.
5. The volume config setting is done.
6. Check iSCSI settings. The IP address of iSCSI data port 1 is 192.168.1.112 and port 2 is 192.168.1.113 for example.
7. Add Target Portals on Microsoft iSCSI initiator 2.03.
8. Input the IP address of iSCSI data port 1 (192.168.1.112 as mentioned in previous pages). For MC/S, there is only ONE **"Target Portal"** in the **"Discovery"** tab.


iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Details
Log On...
Refresh
OK
Cancel
Apply

Select a target and click Log On to access the storage devices for that target. Click details to see information about the sessions, connections and devices for that target.

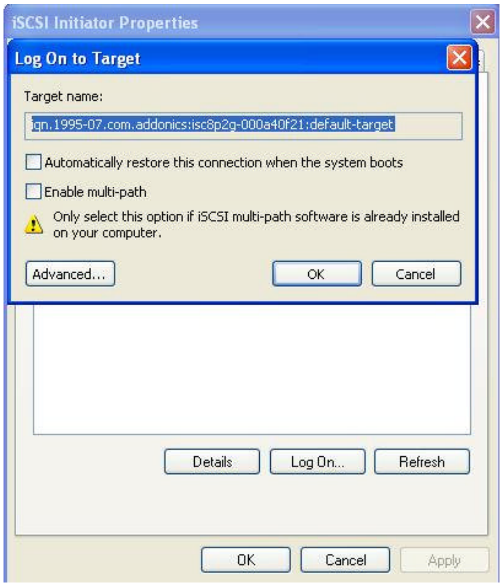
Targets:

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f21:...	Inactive

Figure F.1

9. Click Log On button.

10. Then click **“Advanced…”**.



iSCSI Initiator Properties

Log On to Target

Target name:

iqn.1995-07.com.addonics:isc8p2g-000a40f21:default-target

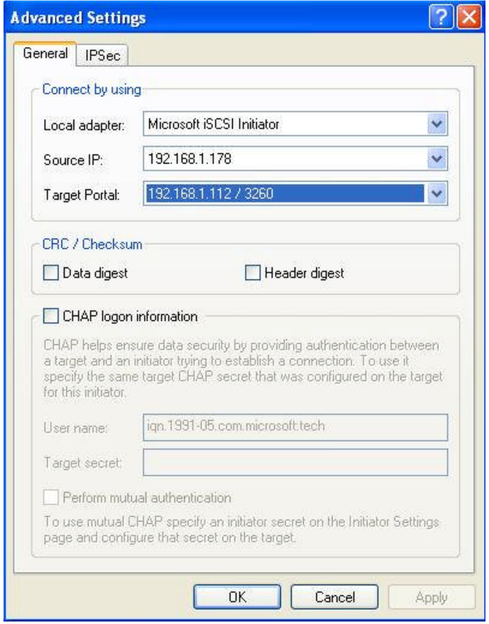
☐ Automatically restore this connection when the system boots

☐ Enable multi-path

Only select this option if iSCSI multi-path software is already installed on your computer.

Figure F.2

11. Select Local Adapter, Source IP, and Target Portal to iSCSI data port 1 (192.168.1.112). Then click **“OK”**.



Advanced Settings

General | IPSec

Connect by using

Local adapter: Microsoft iSCSI Initiator

Source IP: 192.168.1.178

Target Portal: 192.168.1.112 / 3260

CRC / Checksum

☐ Data digest ☐ Header digest

☐ CHAP logon information

CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.

User name: iqn.1991-05.com.microsoft:tech

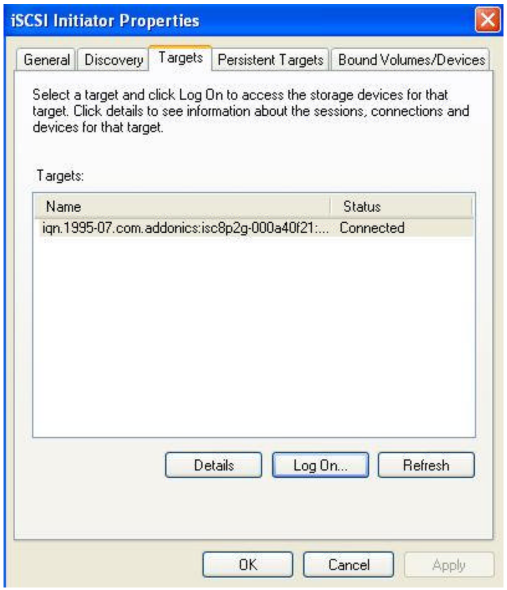
Target secret:

☐ Perform mutual authentication

To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.

Figure F.3

12. After connected, click **"Details"**, then in the **"Session"** tab, click **"Connections"**.

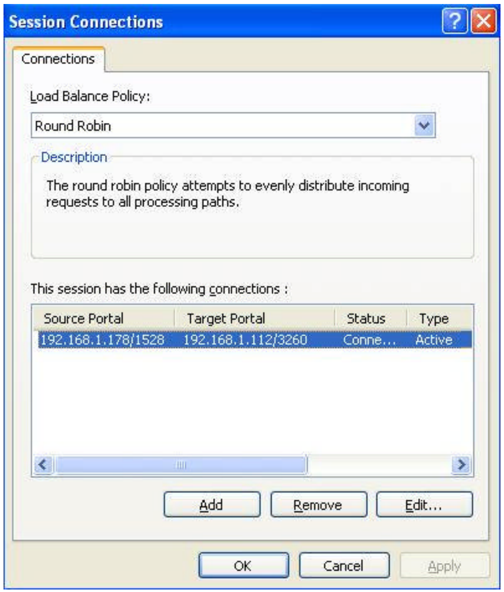

iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Targets:
Details
Log On...
Refresh
OK
Cancel
Apply

Select a target and click Log On to access the storage devices for that target. Click details to see information about the sessions, connections and devices for that target.

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f21:...	Connected

Figure F.4

13. Choose **"Round Robin"** for Load Balance Policy


Session Connections
Connections
Description
Add
Remove
Edit...
OK
Cancel
Apply

Load Balance Policy: Round Robin

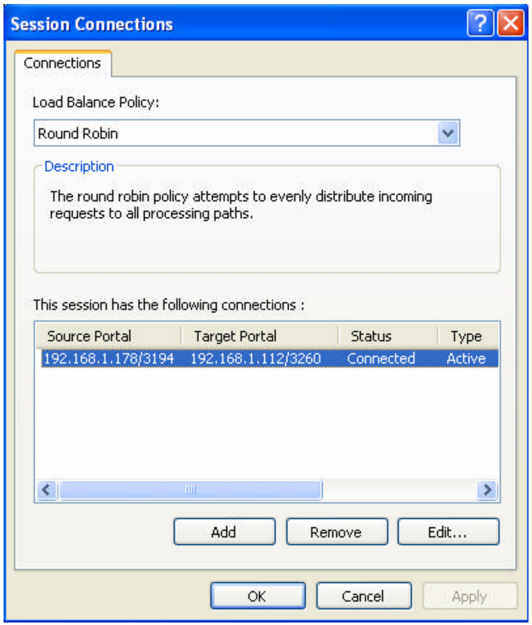
The round robin policy attempts to evenly distribute incoming requests to all processing paths.

This session has the following connections :

Source Portal	Target Portal	Status	Type
192.168.1.178/1528	192.168.1.112/3260	Conne...	Active

Figure F.5

14. **“Add”** Source Portal for the iSCSI data port 2(192.168.1.113)



Session Connections

Connections

Load Balance Policy: Round Robin

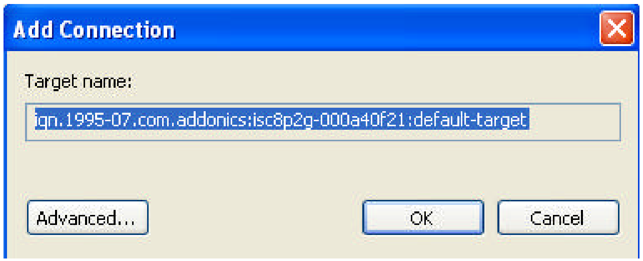
Description

The round robin policy attempts to evenly distribute incoming requests to all processing paths.

This session has the following connections :

Source Portal	Target Portal	Status	Type
192.168.1.178/3194	192.168.1.112/3260	Connected	Active

Figure F.6

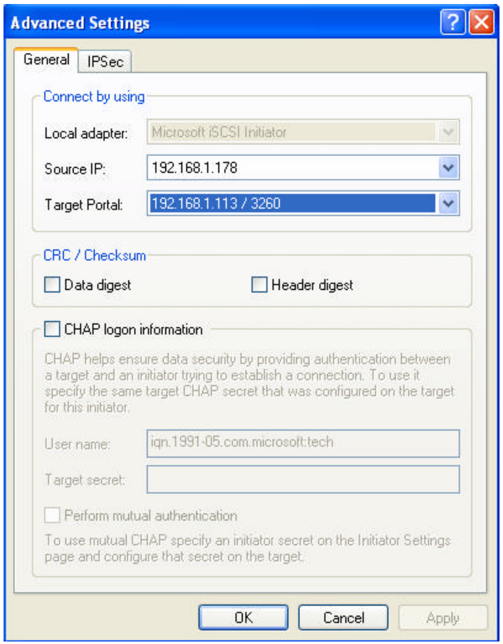


Add Connection

Target name: iqn.1995-07.com.addonics:isc8p2g-000a40f21:default-target

Figure F.7

15. Click on the Advance button. Select Local adapter, Source IP, and Target Portal to iSCSI data port 2 (192.168.1.113). Then select **"OK"**. Click OK.


Advanced Settings
General
IPSec
Connect by using
CRC / Checksum
OK
Cancel
Apply

Local adapter: Microsoft iSCSI Initiator

Source IP: 192.168.1.178

Target Portal: 192.168.1.113 / 3260

☐ Data digest ☐ Header digest

☐ CHAP logon information

CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.

User name: iqn.1991-05.com.microsoft:tech

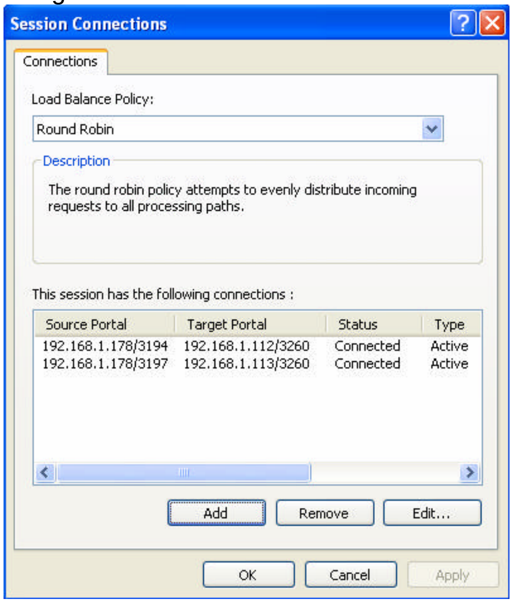
Target secret:

☐ Perform mutual authentication

To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.

Figure F.8

16. The MC/S setting is done .


Session Connections
Connections
Description
Add
Remove
Edit...
OK
Cancel
Apply

Load Balance Policy: Round Robin

The round robin policy attempts to evenly distribute incoming requests to all processing paths.

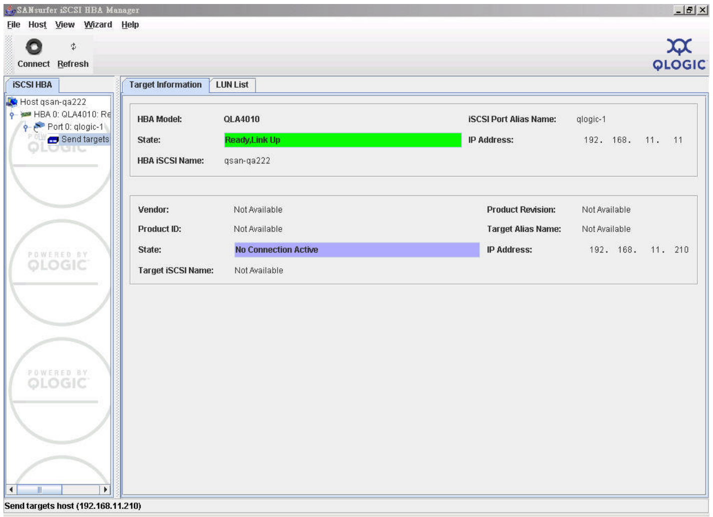
This session has the following connections :

Source Portal	Target Portal	Status	Type
192.168.1.178/3194	192.168.1.112/3260	Connected	Active
192.168.1.178/3197	192.168.1.113/3260	Connected	Active

E. QLogic QLA4010C setup instructions

The following is the step-by-step setup of Qlogic QLA4010C.

1. Log on the iSCSI HBA Manager and the current state shows **"No Connection Active"**.


SANsurfer iSCSI HBA Manager
File
Host
View
Wizard
Help
Connect
Refresh
QLOGIC
iSCSI HBA
Host qsan-qa222
HBA 0: QLA4010: Re
Port 0: qlogic-1
Send targets
Target Information
LUN List

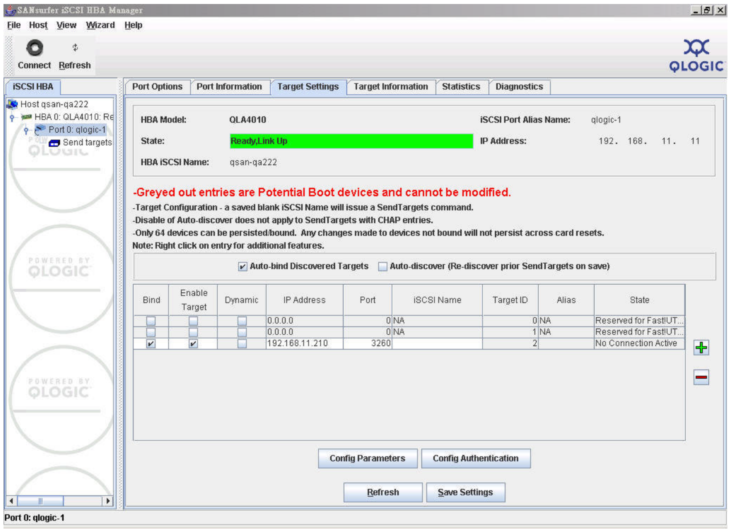
HBA Model: QLA4010
iSCSI Port Alias Name: qlogic-1
State: Ready,Link Up
IP Address: 192. 168. 11. 11
HBA iSCSI Name: qsan-qa222

Vendor: Not Available
Product Revision: Not Available
Product ID: Not Available
Target Alias Name: Not Available
State: No Connection Active
IP Address: 192. 168. 11. 210
Target iSCSI Name: Not Available

Send targets host (192.168.11.210)

Figure G.1

2. Click **"Target settings"**. Then select the target and click **"Config Parameters"**.


SANsurfer iSCSI HBA Manager
File
Host
View
Wizard
Help
Connect
Refresh
QLOGIC
iSCSI HBA
Host qsan-qa222
HBA 0: QLA4010: Re
Port 0: qlogic-1
Send targets
Port Options
Port Information
Target Settings
Target Information
Statistics
Diagnostics
Config Parameters
Config Authentication
Refresh
Save Settings

HBA Model: QLA4010
iSCSI Port Alias Name: qlogic-1
State: Ready,Link Up
IP Address: 192. 168. 11. 11
HBA iSCSI Name: qsan-qa222

-Greyed out entries are Potential Boot devices and cannot be modified.
-Target Configuration - a saved blank iSCSI Name will issue a SendTargets command.
-Disable of Auto-discover does not apply to SendTargets with CHAP entries.
-Only 64 devices can be persisted/bound. Any changes made to devices not bound will not persist across card resets.
Note: Right click on entry for additional features.

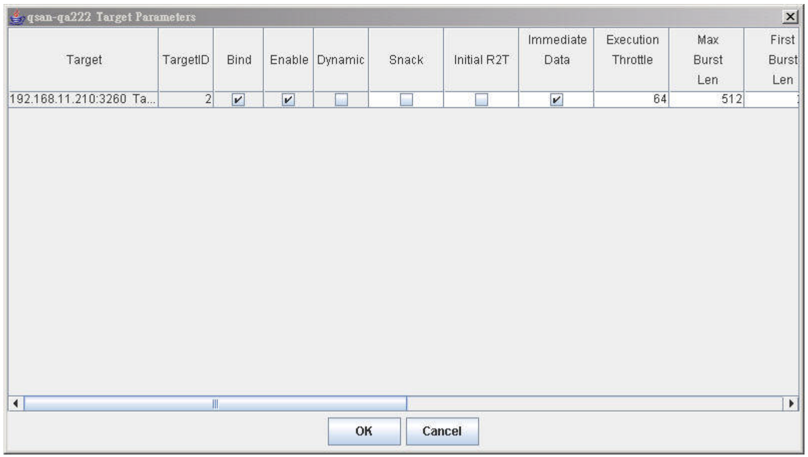
☑ Auto-bind Discovered Targets ☐ Auto-discover (Re-discover prior SendTargets on save)

Bind	Enable Target	Dynamic	IP Address	Port	iSCSI Name	Target ID	Alias	State
☐	☐	☐	0.0.0.0	0	NA	0	NA	Reserved for Fast!UT...
☐	☐	☐	0.0.0.0	0	NA	1	NA	Reserved for Fast!UT...
☑	☑	☐	192.168.11.210	3260		2		No Connection Active

Port 0: qlogic-1

Figure G.2

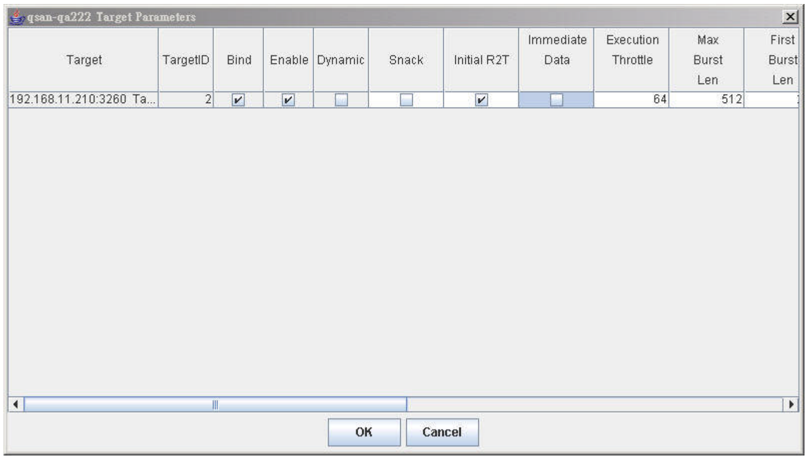
3. Disable **“Immediate Data”** and enable **“Initial R2T”**.


qsan-qa222 Target Parameters
OK
Cancel

Target	TargetID	Bind	Enable	Dynamic	Snack	Initial R2T	Immediate Data	Execution Throttle	Max Burst Len	First Burst Len
192.168.11.210:3260 Ta...	2	☑	☑	☐	☐	☐	☑	64	512	

Figure G.3

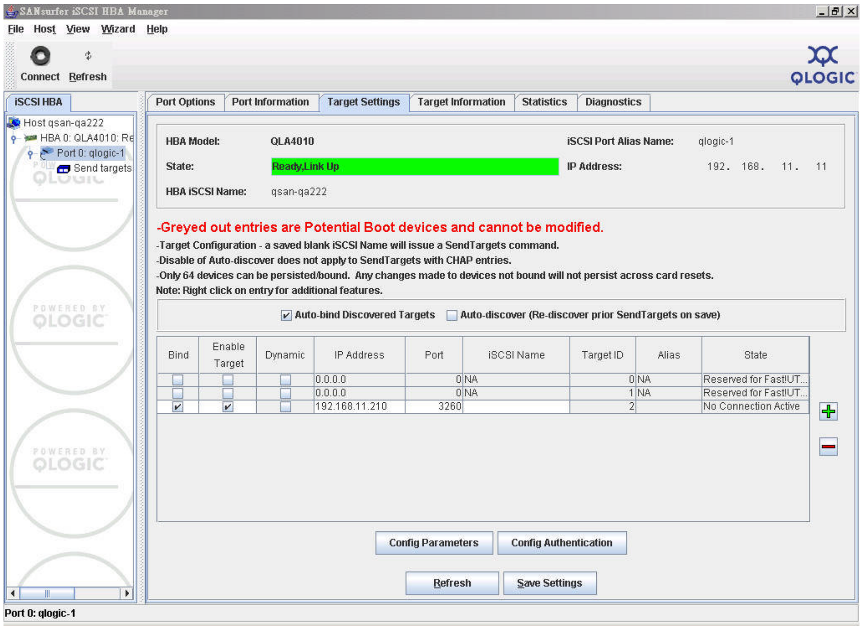
4. Click **“OK”**.


qsan-qa222 Target Parameters
OK
Cancel

Target	TargetID	Bind	Enable	Dynamic	Snack	Initial R2T	Immediate Data	Execution Throttle	Max Burst Len	First Burst Len
192.168.11.210:3260 Ta...	2	☑	☑	☐	☐	☑	☐	64	512	

Figure G.4

5. Click **“Save settings”** and click **“Yes”** on next page.


SANsurfer iSCSI HBA Manager
File Host View Wizard Help
Connect Refresh
QLOGIC
iSCSI HBA
Host qsan-qa222
HBA 0: QLA4010: Re
Port 0: qlogic-1
Send targets
Port Options
Port Information
Target Settings
Target Information
Statistics
Diagnostics
Config Parameters
Config Authentication
Refresh
Save Settings
Port 0: qlogic-1

HBA Model: QLA4010
iSCSI Port Alias Name: qlogic-1
State: Ready,Link Up
IP Address: 192. 168. 11. 11
HBA iSCSI Name: qsan-qa222

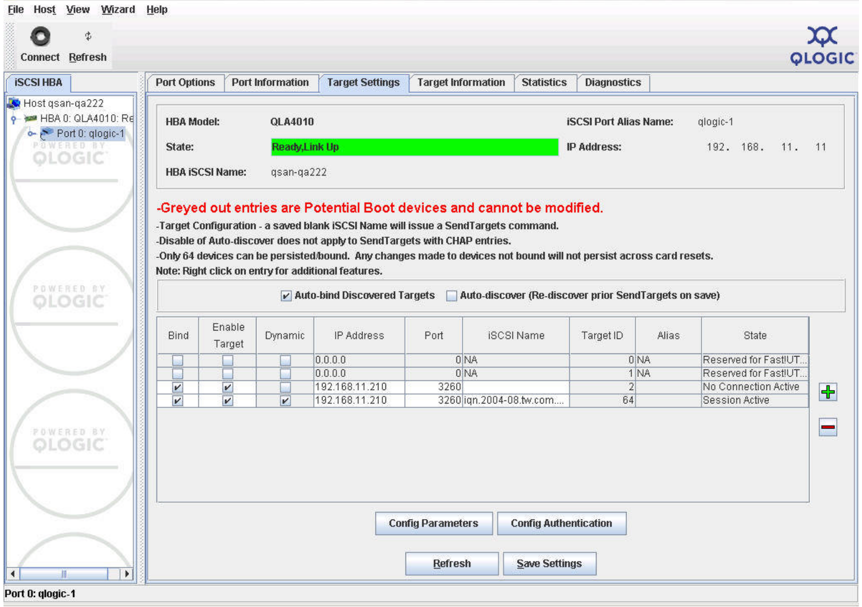
-Greyed out entries are Potential Boot devices and cannot be modified.
-Target Configuration - a saved blank iSCSI Name will issue a SendTargets command.
-Disable of Auto-discover does not apply to SendTargets with CHAP entries.
-Only 64 devices can be persisted/bound. Any changes made to devices not bound will not persist across card resets.
Note: Right click on entry for additional features.

☑ Auto-bind Discovered Targets ☐ Auto-discover (Re-discover prior SendTargets on save)

Bind	Enable Target	Dynamic	IP Address	Port	iSCSI Name	Target ID	Alias	State
☐	☐	☐	0.0.0.0	0	NA	0	NA	Reserved for Fast!UT...
☐	☐	☐	0.0.0.0	0	NA	1	NA	Reserved for Fast!UT...
☑	☑	☐	192.168.11.210	3260		2		No Connection Active

Figure G.5

6. Click **“Refresh”** and find a new target with iSCSI name.


SANsurfer iSCSI HBA Manager
File Host View Wizard Help
Connect Refresh
QLOGIC
iSCSI HBA
Host qsan-qa222
HBA 0: QLA4010: Re
Port 0: qlogic-1
Port Options
Port Information
Target Settings
Target Information
Statistics
Diagnostics
Config Parameters
Config Authentication
Refresh
Save Settings
Port 0: qlogic-1

HBA Model: QLA4010
iSCSI Port Alias Name: qlogic-1
State: Ready,Link Up
IP Address: 192. 168. 11. 11
HBA iSCSI Name: qsan-qa222

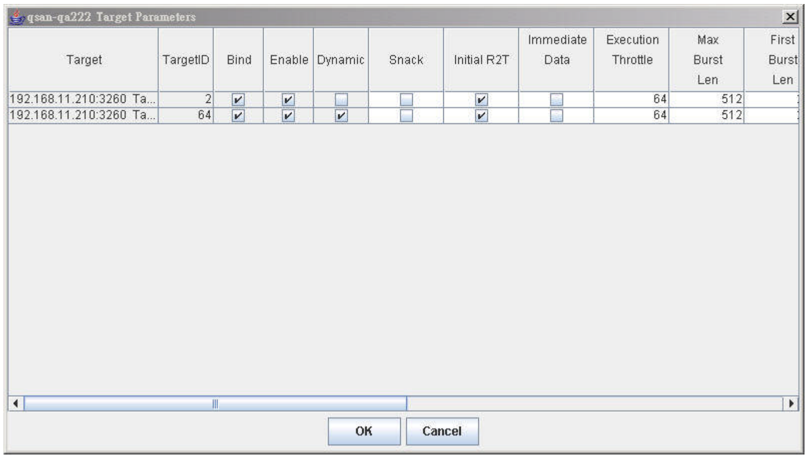
-Greyed out entries are Potential Boot devices and cannot be modified.
-Target Configuration - a saved blank iSCSI Name will issue a SendTargets command.
-Disable of Auto-discover does not apply to SendTargets with CHAP entries.
-Only 64 devices can be persisted/bound. Any changes made to devices not bound will not persist across card resets.
Note: Right click on entry for additional features.

☑ Auto-bind Discovered Targets ☐ Auto-discover (Re-discover prior SendTargets on save)

Bind	Enable Target	Dynamic	IP Address	Port	iSCSI Name	Target ID	Alias	State
☐	☐	☐	0.0.0.0	0	NA	0	NA	Reserved for Fast!UT...
☐	☐	☐	0.0.0.0	0	NA	1	NA	Reserved for Fast!UT...
☑	☑	☐	192.168.11.210	3260		2		No Connection Active
☑	☑	☑	192.168.11.210	3260	iqn.2004-08.tw.com....	64		Session Active

Figure G.6

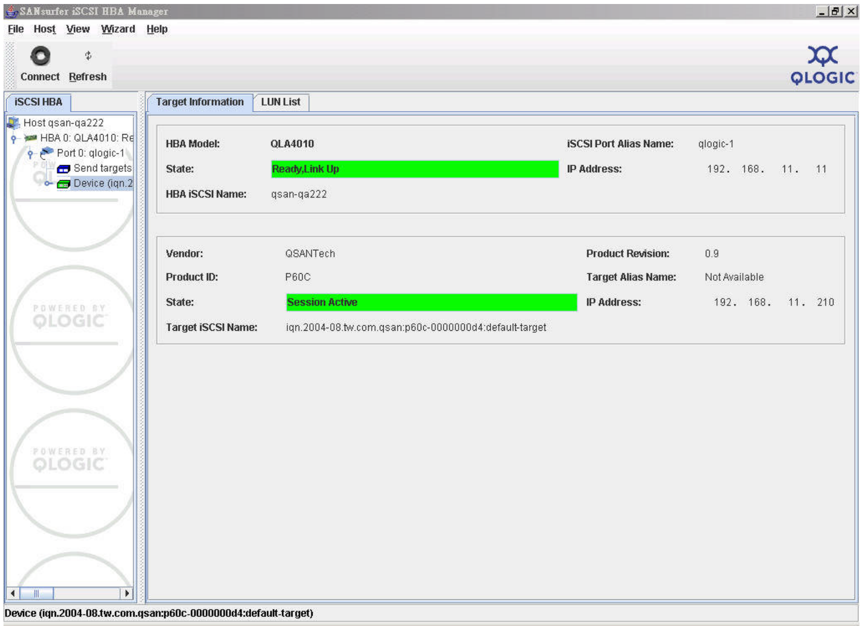
7. Check the parameters. **"Initial R2T"** are must be enabled.


qsan-qa222 Target Parameters
OK
Cancel

Target	TargetID	Bind	Enable	Dynamic	Snack	Initial R2T	Immediate Data	Execution Throttle	Max Burst Len	First Burst Len
192.168.11.210:3260 Ta...	2	☑	☑	☐	☐	☑	☐	64	512	
192.168.11.210:3260 Ta...	64	☑	☑	☑	☐	☑	☐	64	512	

Figure G.7

8. Check **"Target Information"** again and the state changed to **"Session Active"**.


SANsurfer iSCSI HBA Manager
File Host View Wizard Help
Connect
Refresh
QLOGIC
iSCSI HBA
Host qsan-qa222
HBA 0: QLA4010: Re
Port 0: qlogic-1
Send targets
Device (iqn.2
Target Information
LUN List

HBA Model: QLA4010

iSCSI Port Alias Name: qlogic-1

State: Ready,Link Up

IP Address: 192. 168. 11. 11

HBA iSCSI Name: qsan-qa222

Vendor: QSANTech

Product Revision: 0.9

Product ID: P60C

Target Alias Name: Not Available

State: Session Active

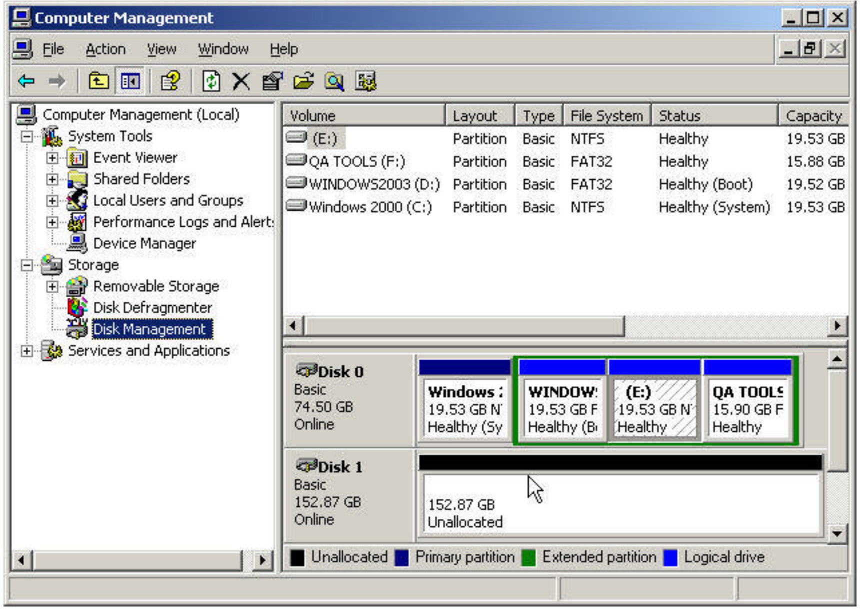
IP Address: 192. 168. 11. 210

Target iSCSI Name: iqn.2004-08.tw.com.qsan:p60c-0000000d4:default-target

Device (iqn.2004-08.tw.com.qsan:p60c-0000000d4:default-target)

Figure G.8

9. Then, run **“Computer Management”** in Windows. Make sure the disk appears.


Computer Management
File
Action
View
Window
Help
Computer Management (Local)
System Tools
Event Viewer
Shared Folders
Local Users and Groups
Performance Logs and Alert:
Device Manager
Storage
Removable Storage
Disk Defragmenter
Disk Management
Services and Applications
Windows :
19.53 GB N
Healthy (Sy
WINDOW:
19.53 GB F
Healthy (B
(E:)
19.53 GB N
Healthy
QA TOOLS
15.90 GB F
Healthy
Unallocated
Primary partition
Extended partition
Logical drive

Volume	Layout	Type	File System	Status	Capacity
(E:)	Partition	Basic	NTFS	Healthy	19.53 GB
QA TOOLS (F:)	Partition	Basic	FAT32	Healthy	15.88 GB
WINDOWS2003 (D:)	Partition	Basic	FAT32	Healthy (Boot)	19.52 GB
Windows 2000 (C:)	Partition	Basic	NTFS	Healthy (System)	19.53 GB

Disk 0
Basic
74.50 GB
Online

Disk 1
Basic
152.87 GB
Online

152.87 GB
Unallocated

Figure G.9

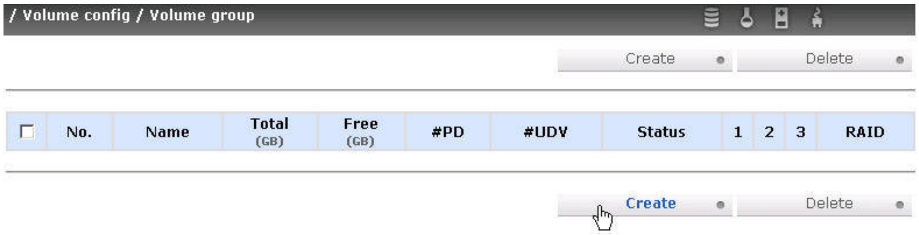
G. Installation Steps for Large Volume (TB)

Introduction:

The ISC8P2G-S is capable of supporting large volumes (>2TB). When connecting controllers to 64bit OS installed host/server, the host/server is inherently capable for large volumes from the 64bit address. On the other side, if the host/server is installed with 32bit OS, user has to change the block size to 1KB, 2KB or 4KB to support volumes up to 4TB, 8TB or 16TB, for the 32bit host/server is not LBA (Logical Block Addressing) 64-bit supported. For detailed installation steps, check below.

Step A: configure your target

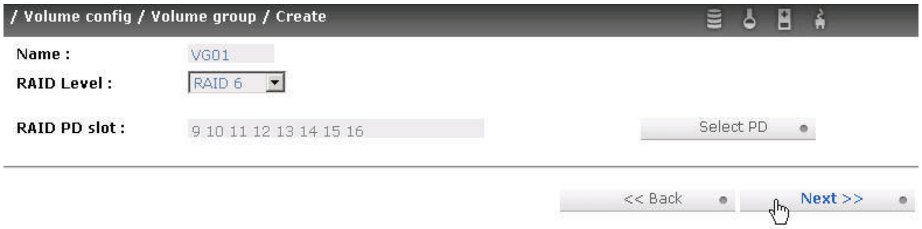
1. Go to **/ Volume config / Volume group**, create a VG.


/ Volume config / Volume group
Create
Delete
Create
Delete

☐	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	RAID

Figure H.1

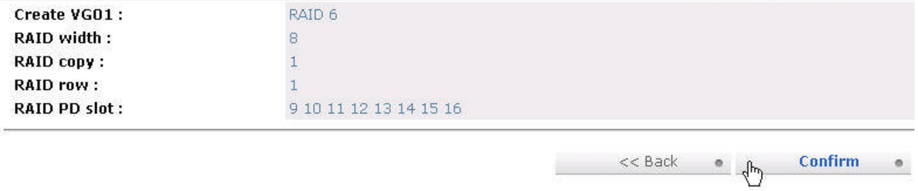
2. Choose RAID level and disks.


/ Volume config / Volume group / Create
Select PD
<< Back
Next >>

Name : VG01
RAID Level : RAID 6
RAID PD slot : 9 10 11 12 13 14 15 16

Figure H.2

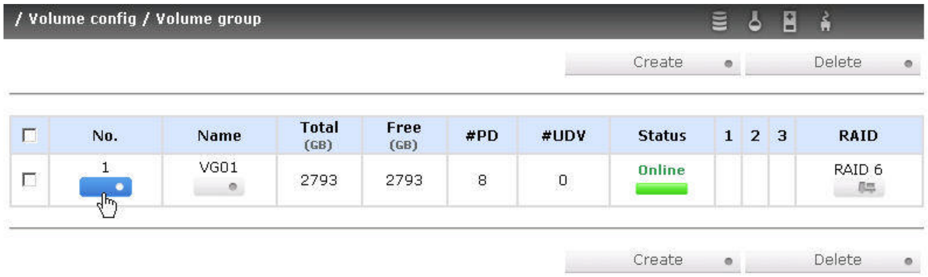
3. Confirm VG settings.


/ Volume config / Volume group / Create / Confirm
<< Back
Confirm

Create VG01 :	RAID 6
RAID width :	8
RAID copy :	1
RAID row :	1
RAID PD slot :	9 10 11 12 13 14 15 16

Figure H.3

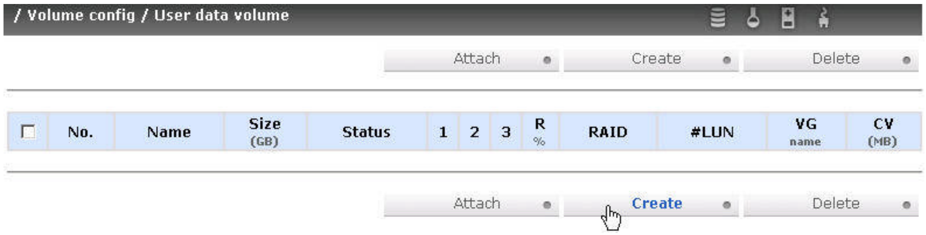
4. A RAID 6 VG is created.


/ Volume config / Volume group
Create
Delete
Create
Delete

☐	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	RAID
☐	1	VG01	2793	2793	8	0	Online				RAID 6

Figure H.4

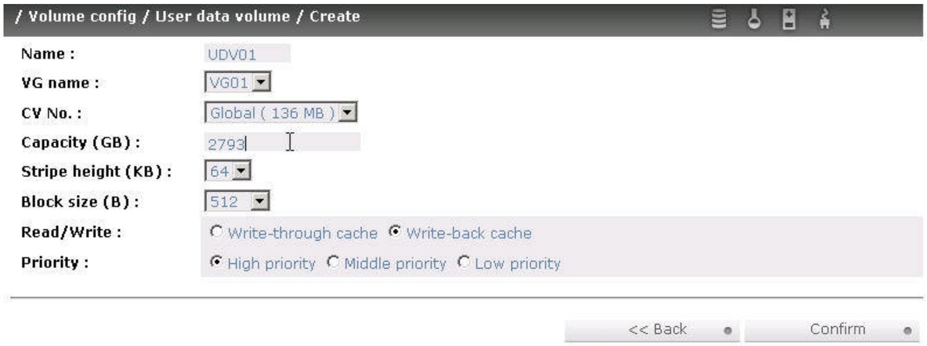
5. Go to **/ Volume config / User data volume** , create a UDV


/ Volume config / User data volume
Attach
Create
Delete
Attach
Create
Delete

☐	No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	VG name	CV (MB)

Figure H.5

6. Setup capacity, stripe height, and block size for UDV.

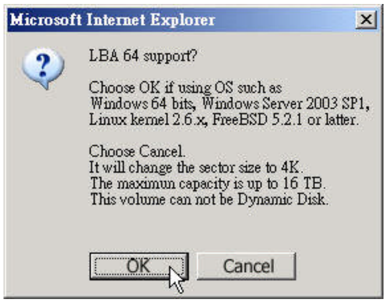

/ Volume config / User data volume / Create
<< Back
Confirm

Name : UDV01
VG name : VG01
CV No. : Global (136 MB)
Capacity (GB) : 2793
Stripe height (KB) : 64
Block size (B) : 512
Read/Write : ○ Write-through cache ● Write-back cache
Priority : ● High priority ○ Middle priority ○ Low priority

Figure H.6

Tips

When the OS is 64bit, user can set the block size to any available value. If the OS is 32bit, user must change the block size to values larger than 512B. There will be a confirmation pop-up when UDV size is over 2TB.


Microsoft Internet Explorer
OK
Cancel

LBA 64 support?

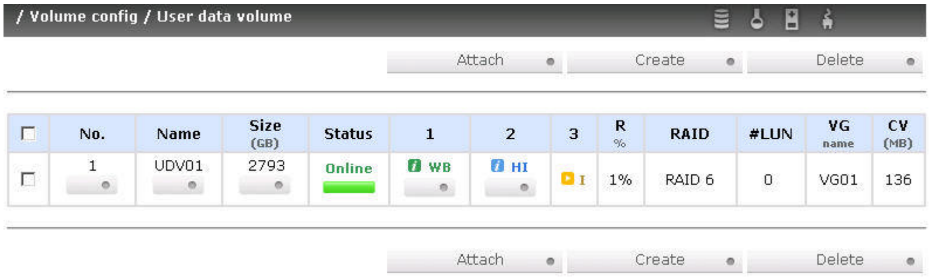
Choose OK if using OS such as
Windows 64 bits, Windows Server 2003 SP1,
Linux kernel 2.6.x, FreeBSD 5.2.1 or latter.

Choose Cancel.
It will change the sector size to 4K.
The maximum capacity is up to 16 TB.
This volume can not be Dynamic Disk.

Figure H.7:

(Figure H.7: choose "OK" for 64bit OS, choose "Cancel" for 32bit OS, this step will change block size to 4K automatically.)

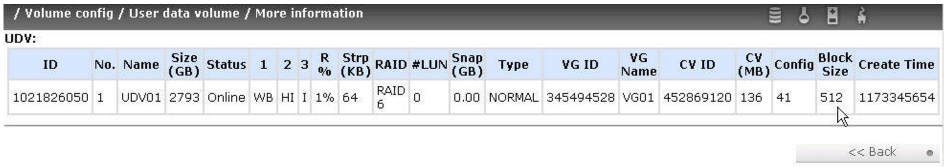
7. A 2.793TB UDV is created.


/ Volume config / User data volume
Attach
Create
Delete
Attach
Create
Delete

☐	No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	VG name	CV (MB)
☐	1	UDV01	2793	Online	WB	HI	I	1%	RAID 6	0	VG01	136

Figure H.8: a 2793G UDV is created.

8. Check the detail information.

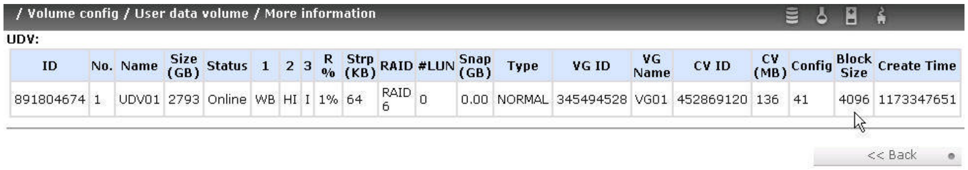

/ Volume config / User data volume / More information
<< Back

UDV:

ID	No.	Name	Size (GB)	Status	1	2	3	R %	Strp (KB)	RAID	#LUN	Snap (GB)	Type	VG ID	VG Name	CV ID	CV (MB)	Config	Block Size	Create Time
1021826050	1	UDV01	2793	Online	WB	HI	I	1%	64	RAID 6	0	0.00	NORMAL	345494528	VG01	452869120	136	41	512	1173345654

Figure H.9

(Figure H.9: block size = 512B, for 64bit OS setting.)


/ Volume config / User data volume / More information
<< Back

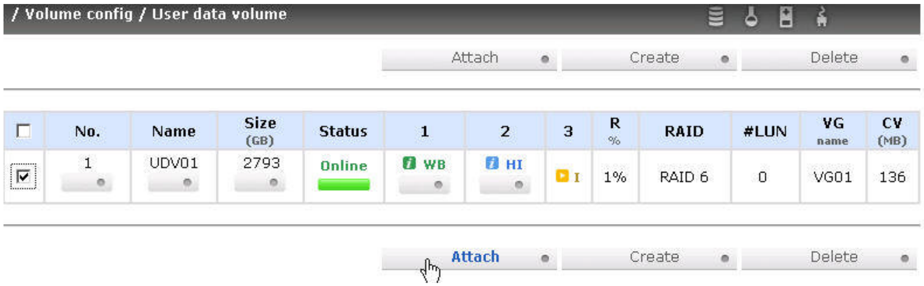
UDV:

ID	No.	Name	Size (GB)	Status	1	2	3	R %	Strp (KB)	RAID	#LUN	Snap (GB)	Type	VG ID	VG Name	CV ID	CV (MB)	Config	Block Size	Create Time
891804674	1	UDV01	2793	Online	WB	HI	I	1%	64	RAID 6	0	0.00	NORMAL	345494528	VG01	452869120	136	41	4096	1173347651

Figure H.10

(Figure H.10: block size = 4K, for 32bit OS setting.)

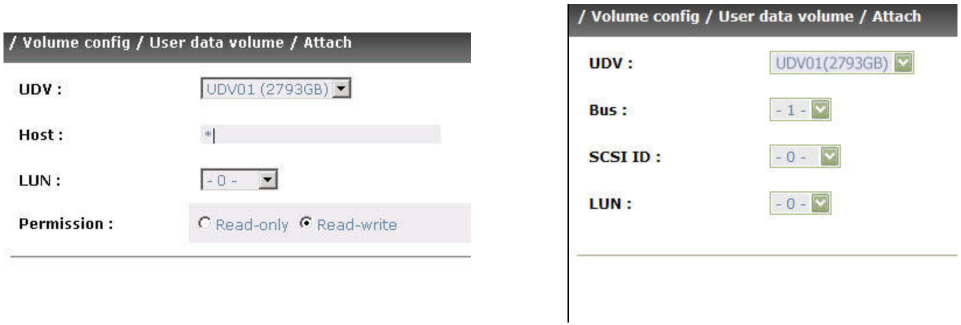
9. Attach LUN.


/ Volume config / User data volume
Attach
Create
Delete

☐	No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	VG name	CV (MB)
☑	1	UDV01	2793	Online	WB	HI	I	1%	RAID 6	0	VG01	136

Attach
Create
Delete

Figure H.11


/ Volume config / User data volume / Attach

UDV : UDV01 (2793GB)
Host : *
LUN : - 0 -
Permission : ○ Read-only ● Read-write

/ Volume config / User data volume / Attach

UDV : UDV01(2793GB)
Bus : - 1 -
SCSI ID : - 0 -
LUN : - 0 -

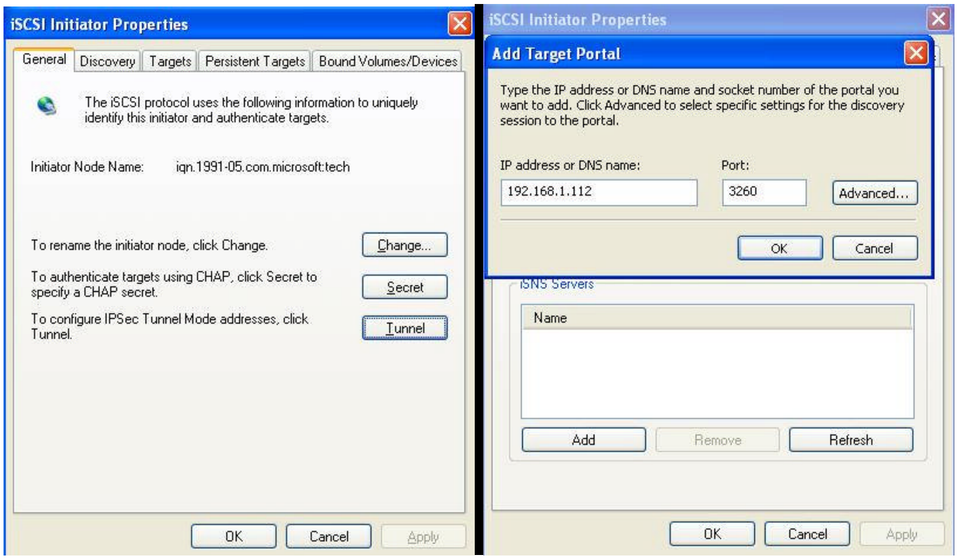
Figure H.12

(Figure H.12: Left: P series; Right: S series attach LUN.)

Step B: configure your host/server

1. You need to setup software iscsi initiat or or iSCSI HBA first.

2. Below is the configuration for Windows Server 2003 R2 with Microsoft iscsi initiator. Please install the latest Microsoft iscsi initiator from the link below.
   http://www.microsoft.com/downloads/details.aspx?familyid=12cb3c1a -15d6-4585-b385-befd1319f825&displaylang=en


iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Change...
Secret
Tunnel
OK
Cancel
Apply
iSCSI Initiator Properties
Add Target Portal
Advanced...
OK
Cancel
iSNS Servers
Name
Add
Remove
Refresh
OK
Cancel
Apply

The iSCSI protocol uses the following information to uniquely identify this initiator and authenticate targets.

Initiator Node Name: iqn.1991-05.com.microsoft:tech

To rename the initiator node, click Change.

To authenticate targets using CHAP, click Secret to specify a CHAP secret.

To configure IPSec Tunnel Mode addresses, click Tunnel.

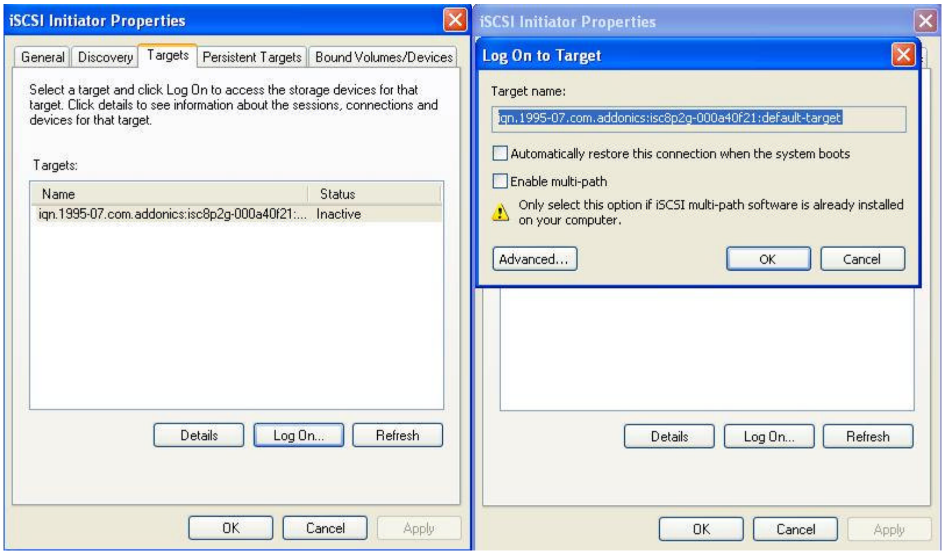
Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.

IP address or DNS name: 192.168.1.112

Port: 3260

Figure H.13

(Figure H.13: Run MS iSCSI initiator, go to “Discovery” tab, add target portal (iSCSI data).)


iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Details
Log On...
Refresh
OK
Cancel
Apply
Log On to Target
Advanced...

Select a target and click Log On to access the storage devices for that target. Click details to see information about the sessions, connections and devices for that target.

Targets:

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f21:...	Inactive

Target name:

iqn.1995-07.com.addonics:isc8p2g-000a40f21:default-target

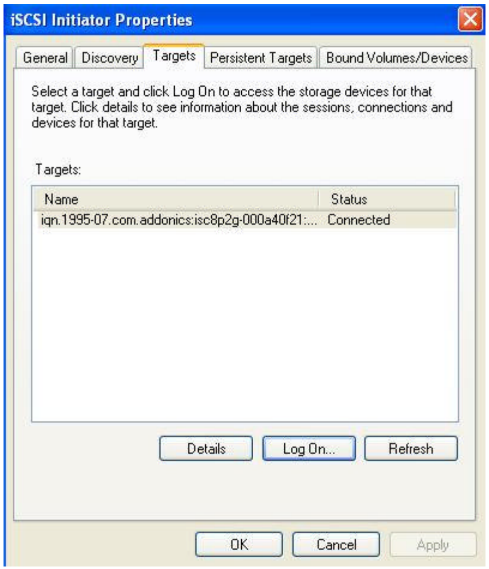
☐ Automatically restore this connection when the system boots

☐ Enable multi-path

⚠ Only select this option if iSCSI multi-path software is already installed on your computer.

Figure H.14

(Figure H.14: go to "Targets" tab, click "Refresh", and then "Log On…" the target.)


iSCSI Initiator Properties
General
Discovery
Targets
Persistent Targets
Bound Volumes/Devices
Details
Log On...
Refresh
OK
Cancel
Apply

Select a target and click Log On to access the storage devices for that target. Click details to see information about the sessions, connections and devices for that target.

Targets:

Name	Status
iqn.1995-07.com.addonics:isc8p2g-000a40f21:...	Connected

Figure H.15

(Figure H.15: Status is "Connected", the initiator setting is done.)

Step C: Initialize/Format/Mount the disk

1. Go to Start à Control Panel à Computer Management à Device Manger à Disk drives

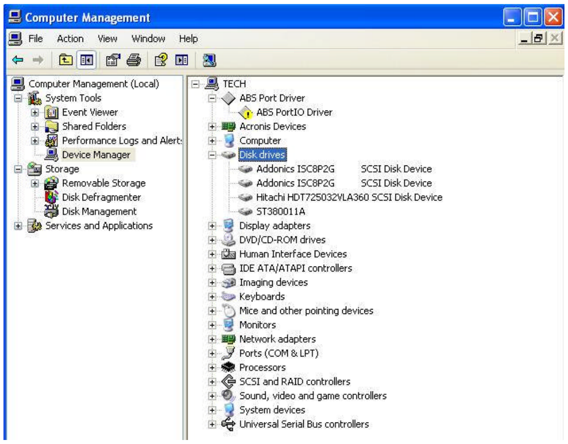
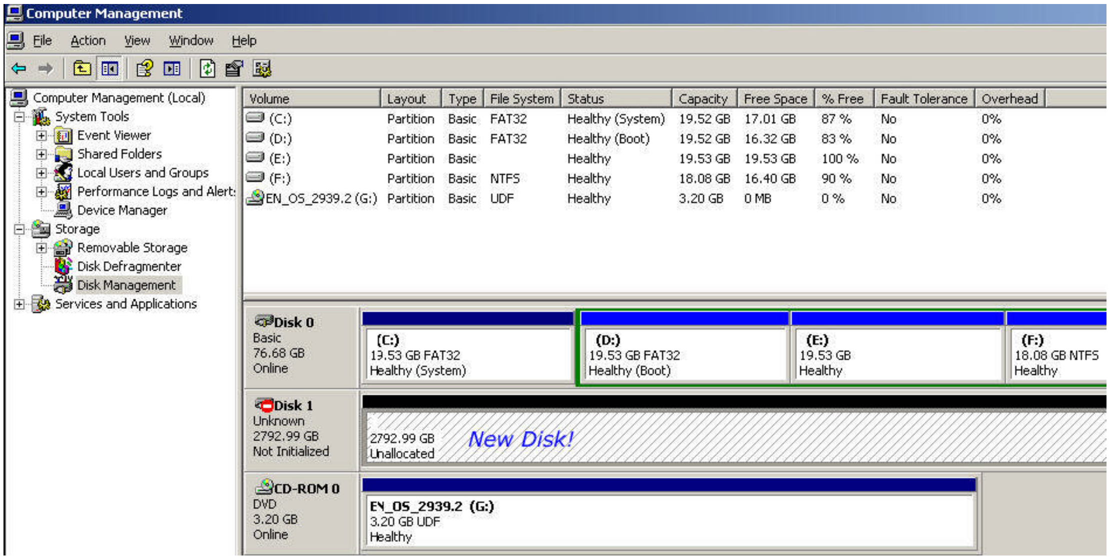

Computer Management
File
Action
View
Window
Help
Computer Management (Local)
System Tools
Event Viewer
Shared Folders
Performance Logs and Alert:
Device Manager
Storage
Removable Storage
Disk Defragmenter
Disk Management
Services and Applications
TECH
ABS Port Driver
ABS PortIO Driver
Acronis Devices
Computer
Disk drives
Addonics ISC8P2G SCSI Disk Device
Addonics ISC8P2G SCSI Disk Device
Hitachi HDT725032VLA360 SCSI Disk Device
ST380011A
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Imaging devices
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Ports (COM & LPT)
Processors
SCSI and RAID controllers
Sound, video and game controllers
System devices
Universal Serial Bus controllers

Figure H.16

(Figure H.16: Disk drive status of ISC8P2G-S.)

2. Go to Start à Control Panel à Computer Management à Disk Management, it displays a new disk.


Computer Management
File
Action
View
Window
Help
Computer Management (Local)
System Tools
Event Viewer
Shared Folders
Local Users and Groups
Performance Logs and Alert:
Device Manager
Storage
Removable Storage
Disk Defragmenter
Disk Management
Services and Applications

Volume	Layout	Type	File System	Status	Capacity	Free Space	% Free	Fault Tolerance	Overhead
(C:)	Partition	Basic	FAT32	Healthy (System)	19.52 GB	17.01 GB	87 %	No	0%
(D:)	Partition	Basic	FAT32	Healthy (Boot)	19.52 GB	16.32 GB	83 %	No	0%
(E:)	Partition	Basic		Healthy	19.53 GB	19.53 GB	100 %	No	0%
(F:)	Partition	Basic	NTFS	Healthy	18.08 GB	16.40 GB	90 %	No	0%
EN_OS_2939.2 (G:)	Partition	Basic	UDF	Healthy	3.20 GB	0 MB	0 %	No	0%

Disk 0
Basic
76.68 GB
Online
(C:)
19.53 GB FAT32
Healthy (System)
(D:)
19.53 GB FAT32
Healthy (Boot)
(E:)
19.53 GB
Healthy
(F:)
18.08 GB NTFS
Healthy
Disk 1
Unknown
2792.99 GB
Not Initialized
2792.99 GB
Unallocated
New Disk!
CD-ROM 0
DVD
3.20 GB
Online
EN_OS_2939.2 (G:)
3.20 GB UDF
Healthy

Figure H.17

3. Initialize disk.

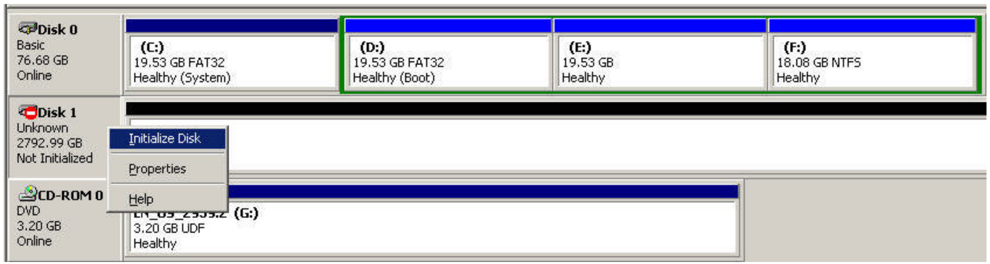

Disk 0
Basic
76.68 GB
Online
(C:)
19.53 GB FAT32
Healthy (System)
(D:)
19.53 GB FAT32
Healthy (Boot)
(E:)
19.53 GB
Healthy
(F:)
18.08 GB NTFS
Healthy
Disk 1
Unknown
2792.99 GB
Not Initialized
Initialize Disk
Properties
Help
CD-ROM 0
DVD
3.20 GB
Online
(G:)
3.20 GB UDF
Healthy

Figure H.18

4. Convert to GPT disk for over 2TB capacity. For more detail information about GPT, please visit http://www.microsoft.com/whdc/device/storage/GPT_FAQ.mspx

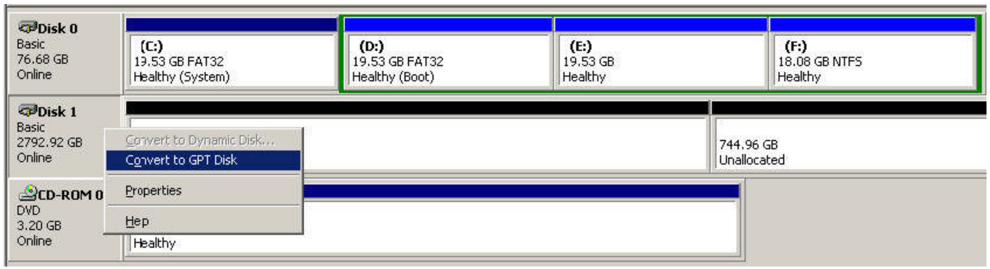

Disk 0
Basic
76.68 GB
Online
(C:)
19.53 GB FAT32
Healthy (System)
(D:)
19.53 GB FAT32
Healthy (Boot)
(E:)
19.53 GB
Healthy
(F:)
18.08 GB NTFS
Healthy
Disk 1
Basic
2792.92 GB
Online
Convert to Dynamic Disk...
Convert to GPT Disk
Properties
Hep
744.96 GB
Unallocated
CD-ROM 0
DVD
3.20 GB
Online
Healthy

Figure H.19

5. Format disk.

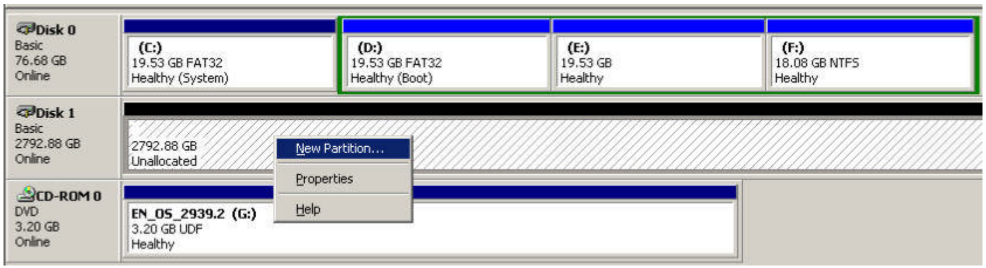

Disk 0
Basic
76.68 GB
Online
(C:)
19.53 GB FAT32
Healthy (System)
(D:)
19.53 GB FAT32
Healthy (Boot)
(E:)
19.53 GB
Healthy
(F:)
18.08 GB NTFS
Healthy
Disk 1
Basic
2792.88 GB
Online
2792.88 GB
Unallocated
New Partition...
Properties
Help
CD-ROM 0
DVD
3.20 GB
Online
EN_OS_2939.2 (G:)
3.20 GB UDF
Healthy

Figure H.20

6. Format disk is done.

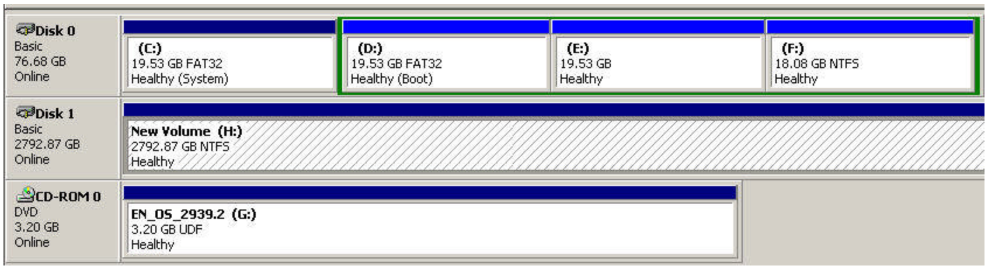
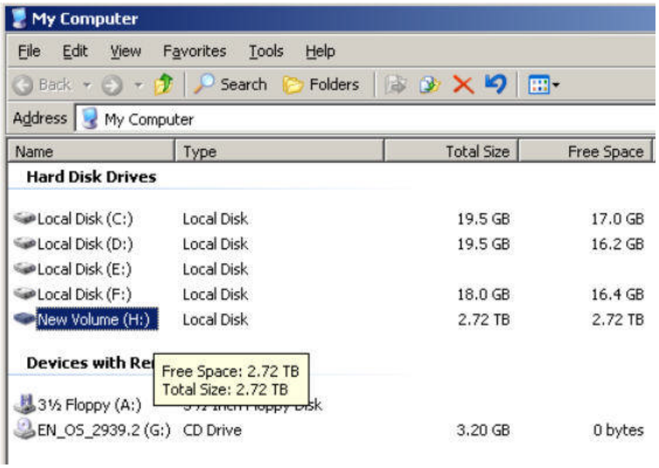

Disk 0
Basic
76.68 GB
Online
(C:)
19.53 GB FAT32
Healthy (System)
(D:)
19.53 GB FAT32
Healthy (Boot)
(E:)
19.53 GB
Healthy
(F:)
18.08 GB NTFS
Healthy
Disk 1
Basic
2792.87 GB
Online
New Volume (H:)
2792.87 GB NTFS
Healthy
CD-ROM 0
DVD
3.20 GB
Online
EN_OS_2939.2 (G:)
3.20 GB UDF
Healthy

Figure H.21

7. The new disk is ready, available size = 2.72TB.


My Computer
File Edit View Favorites Tools Help
Back Search Folders
Address My Computer

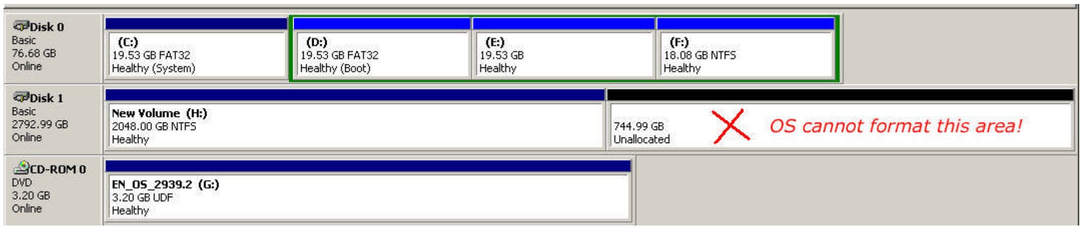
Name	Type	Total Size	Free Space
Hard Disk Drives			
Local Disk (C:)	Local Disk	19.5 GB	17.0 GB
Local Disk (D:)	Local Disk	19.5 GB	16.2 GB
Local Disk (E:)	Local Disk		
Local Disk (F:)	Local Disk	18.0 GB	16.4 GB
New Volume (H:)	Local Disk	2.72 TB	2.72 TB
Devices with Re			
3½ Floppy (A:)	3½ Inch Floppy Disk		
EN_OS_2939.2 (G:)	CD Drive	3.20 GB	0 bytes

Free Space: 2.72 TB
Total Size: 2.72 TB

Figure H.22

Caution
If the user has setup 512B as block size for UDV and the host/server OS is 32bit, in the last step of formatting disk, user will find OS cannot format the area after 2048GB (2TB).

8. Wrong setting result: OS cannot format area after 2048GB(2TB).



Disk 0
Basic
76.68 GB
Online

(C:)
19.53 GB FAT32
Healthy (System)

(D:)
19.53 GB FAT32
Healthy (Boot)

(E:)
19.53 GB
Healthy

(F:)
18.08 GB NTFS
Healthy

Disk 1
Basic
2792.99 GB
Online

New Volume (H:)
2048.00 GB NTFS
Healthy

744.99 GB
Unallocated

OS cannot format this area!

CD-ROM 0
DVD
3.20 GB
Online

EN_OS_2939.2 (G:)
3.20 GB UDF
Healthy

Figure H.23